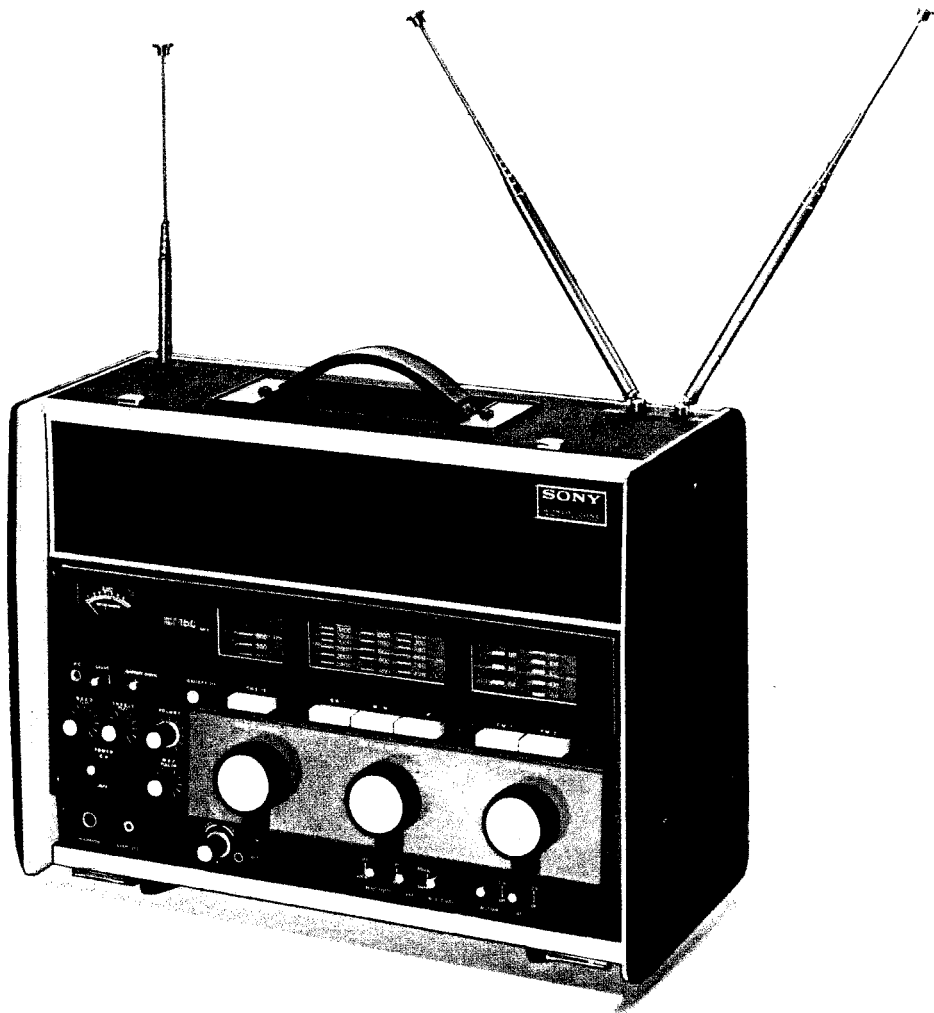


CRF-230B

2363



SONY® SERVICE MANUAL

2363

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SECTION 1 OUTLINE

1-1. SPECIFICATIONS

Circuit System:	Superheterodyne (FM-1, FM-2, MW, LW, SW-1) Double superheterodyne (SW-2 ~ SW-19)
Semiconductor:	27 transistors, 4FET for reception, 17 transistors for auxiliary functions, 34 diodes, 2 thermistor
Frequency Coverage:	FM-1 ; 76 - 90 MHz FM-2 ; 87.5 - 108 MHz MW ; 530 - 1,605 kHz (566 - 187 m) LW ; 150 - 400 kHz (2,000 - 750 m) SW-1 ; 1.6 - 4.5 MHz (187 - 66 m ; Marine Band) SW-2 ; 2.0 - 2.6 MHz (120 m) SW-3 ; 3.0 - 3.6 MHz (90 m) SW-4 ; 3.5 - 4.1 MHz (75 - 81 m) SW-5 ; 4.5 - 5.1 MHz (60 m) SW-6 ; 5.8 - 6.4 MHz (49 m) SW-7 ; 7.0 - 7.6 MHz (40 - 41 m) SW-8 ; 9.5 - 10.1 MHz (31 m) SW-9 ; 11.5 - 12.1 MHz (25 m) SW-10 ; 14.0 - 14.6 MHz (20 m) SW-11 ; 15.0 - 15.6 MHz (19 m) SW-12 ; 17.5 - 18.1 MHz (16 m) SW-13 ; 21.0 - 21.6 MHz (15 m) SW-14 ; 21.4 - 22.0 MHz (13 m) SW-15 ; 25.5 - 26.1 MHz (11 m) SW-16 ; 26.8 - 27.4 MHz (11 m) SW-17 ; 28.0 - 28.6 MHz (10 m) SW-18 ; 28.6 - 29.2 MHz (10 m) SW-19 ; 29.2 - 29.8 MHz (10 m)
Intermediate Frequency:	FM ; 10.7 MHz MW, LW, SW-1 ; 455 kHz SW-2 ~ SW-19 ; 1st : 1.6 - 2.2 MHz 2nd: 455 kHz
Antenna System:	FM ; telescopic antennas 1,000 mm 2 pcs external antenna terminals (300 Ω , 75 Ω) are provided MW, LW ; built-in ferrite bar antenna, 10 ϕ x 180 mm external antenna terminal is provided SW-1 ~ SW-19 ; telescopic antenna 1,470 mm external antenna terminal is provided
Power Requirement:	AC 100, 120, 220, 240 V, 50/60 Hz (c/s) DC 9 V, battery (size "D") 6 pcs DC 12 V, with SONY car battery cord DCC-2AW (optional)
Power Output: at 10% distortion	4 W with AC power supply 1.5 W with DC power supply
Current Drain: at zero signal	AC 180 mA DC 90 mA
Maximum Sensitivity: at output 50 mW, S/N 6 dB	FM ; -2 dB (0.8 μ V) MW ; 28 dB/m (25 μ V/m) LW ; 36 dB/m (63 μ V/m) SW ; 0 dB (1 μ V); average

- Selectivity:** LW, MW, SW-1 ~ SW-19; 40 dB at BROAD position
60 dB at SHARP position
- Muting Level:** 10 ~ 30 dB (adjustable)
- Signal-to-Noise Ratio:** FM; 63 dB at 54 dB input, 400 Hz, 30% modulation
MW; 37 dB at 60 dB input, 400 Hz, 30% modulation
LW; 30 dB at 60 dB input, 400 Hz, 30% modulation
SW; 44 dB at 44 dB input, 400 Hz, 30% modulation
- Image Rejection:** FM-1; 72 dB at 77 MHz
FM-2; 72 dB at 98 MHz
MW; 60 dB at 1,605 kHz
LW; 80 dB at 360 kHz
SW-1; 30 dB at 4.5 MHz
SW-2; 80 dB at 2.5 MHz
SW-19; 30 dB at 29 MHz
- Frequency Response:** 100 - 20,000 Hz within ± 10 dB by tone control
- AUX Input Jack**
input impedance: 5 k Ω
maximum sensitivity: -53 dB (1.7 mV) at 50 mW output
- MPX Output Jack**
output impedance: 5 k Ω
output level: -24 dB (49 mV) at 5 k Ω load impedance
- Recording Jack**
output impedance: 2.2 k Ω
output level: -50 dB (2.5 mV)
- Recording Connector**
output impedance: 80 k Ω
output level: -29.5 dB (26 mV)
- External Speaker Jack:** 3 ~ 8 Ω speakers can be connected
- Headphone Jack:** 8 Ω headphone can be connected
- Earphone Jack:** 8 Ω earphone can be connected
- Other Controls:** Battery check switch
Calibrator reset knob
AGC/MGC knob
BFO control knob
Selectivity switch
Noise limiter switch
Muting switch
Sensitivity switch
- Dimensions:** 17 ¹³/₁₆" (W) $\times$ 12 ¹³/₁₆" (H) $\times$ 7 ¹/₂" (D)
(452 mm $\times$ 325 mm $\times$ 190 mm)
- Weight:** 31 lb, 14 kg (without batteries)
- Supplied Accessories:** AC power cord
polishing cloth

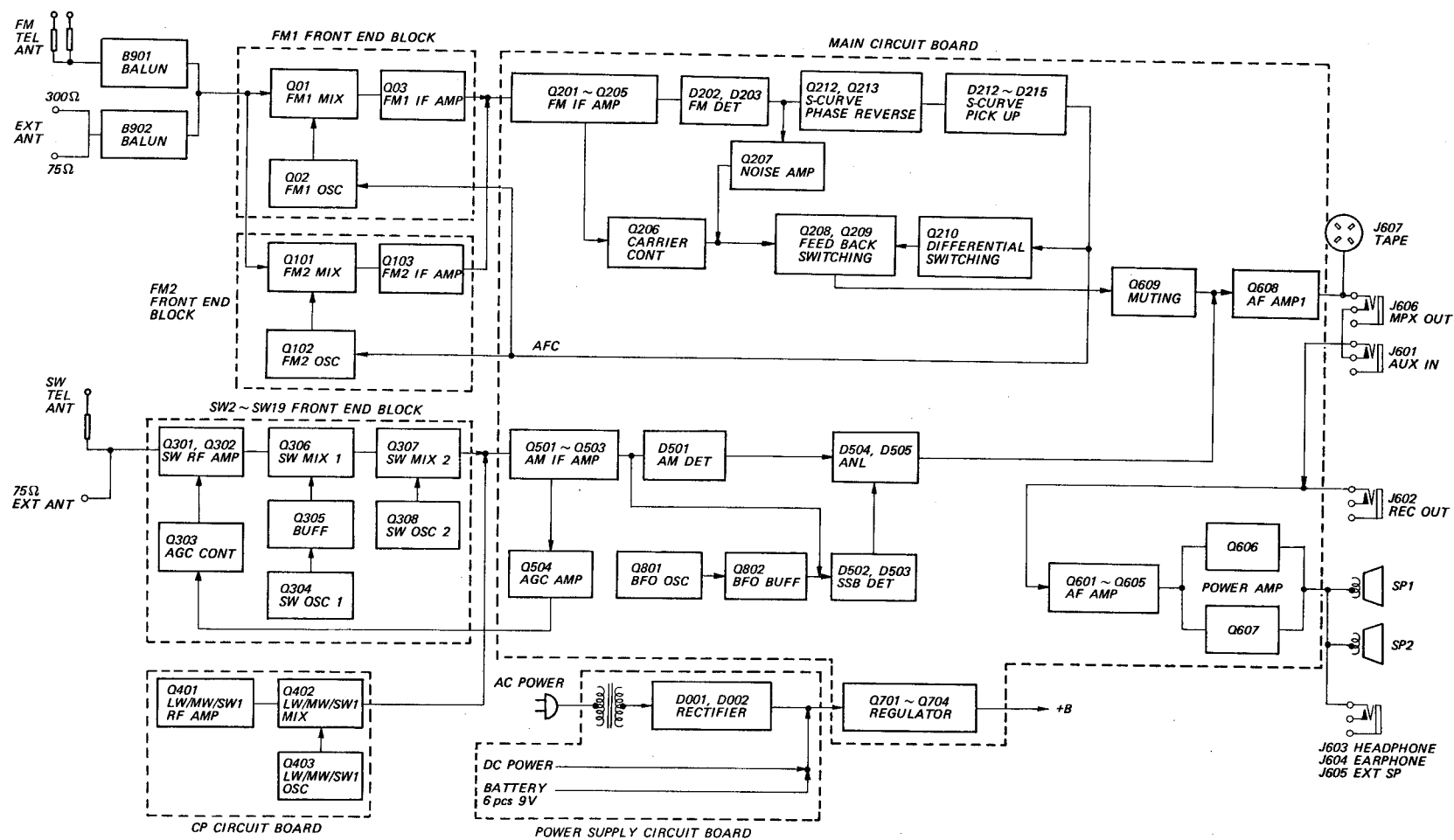


Fig. 1-1

1-3 TECHNICAL FEATURES

The SONY Model CRF-230B is a high-performance radio receiver having many features found in communication receivers. Among them are the following:

- A total of 23 bands covering the broadcast frequencies of any country in the world. Included are 2 fm bands, 19 sw bands, a mw band and 1 lw band.
- FET (Field Effect Transistor) front ends in fm and sw bands provide superior sensitivity, image rejection, and stability.
- Easy-to-tune sw bands due to a dual-conversion system providing a uniform 600 kHz tuning range on each band.
- Product detector for receiving ssb signals.
- An fm i-f circuit employing ceramic filters. An a-m i-f circuit employing two ceramic filters with two-step adjustable selectivity.
- Individual tuning knobs for sw2 ~ 19 bands, sw1/mw/lw bands and fm bands. Preset-tuning of three stations is available.
- The power supply will operate from household current in any country of the world (via built-in voltage selector), internal battery, or car battery.
- Stable, noise-free fm tuning by means of AFC and a muting system.
- ANL (Automatic Noise Limiter) to minimize noise.
- Up to 4 watts of undistorted audio power output with two built-in speakers or external speakers.

1-4. CIRCUIT EXPLANATIONS

AFC (Automatic Frequency Control) Available for Both FM Bands

In the Model CRF-230B, the local oscillator frequency is above the signal frequency for the FM2 band, but below the signal frequency for the FM1 band. Because of this, oscillator drift produces a detector dc output-voltage change of different polarity on the FM1 band than on the FM2 band. Therefore, dc control voltages taken directly from the detector output can not be used to stabilize the frequency of the local oscillator. To get around this problem, a comparator circuit with selectable output polarity is used (Fig. 1-2). The detector output is divided by equal-value resistors R232 and R233 to provide two voltages identical in magnitude but opposite in polarity. These voltages are compared against a reference voltage of approximately 1.5 volts produced by the forward voltage drop across D204 and D205. The resultant voltages are applied to the bases of transistor Q211 and Q212. The each collector voltage is fed through AFC switch S202 to variable-capacitance diode (D01 for FM1 band and D101 for FM2 band). The variable-capacitance diode is voltage sensitive, so its capacitance (and hence the oscillator frequency) depends on the magnitude of the control voltage. Load resistors R254, R255 and also R258, R259 are connected in a balanced bridge and the contact voltage at the junction of R260 and R261 is used as a fixed bias voltage (0.7V) for the variable-capacitance diode when AFC switch S202 is set to OFF.

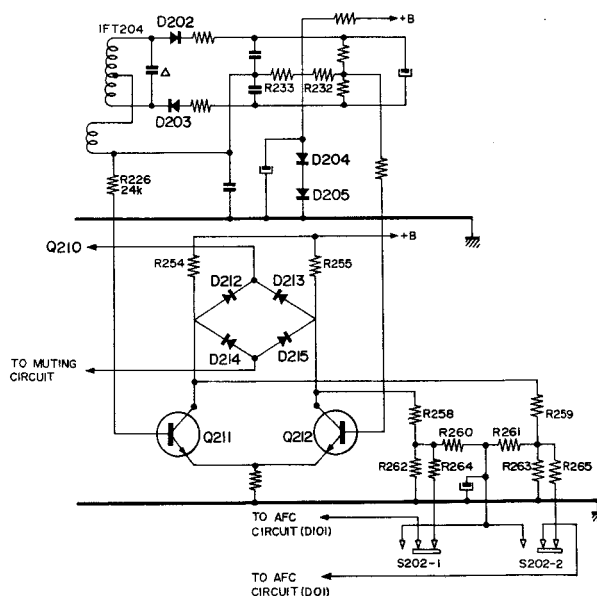


Fig. 1-2

Muting Circuit:

When the receiver is detuned from a signal, the signal decreases. Since less i-f signal is then rectified by diodes D207 and D208, the negative output voltage of these rectifiers can no longer back the positive voltage applied to the base of transistor Q206 through adjustable resistor VR901 (Fig. 1-3). This allows Q206 to conduct lowering its collector voltage. Since the collector of Q206 is connected to the base of PNP transistor Q209, Q209 conducts when its base voltage decreases (with respect to ground), thereby causing transistor Q208 to conduct. The collector voltage of Q208 then drops to near ground potential. The voltage at the collector of Q208 is fed to the base of transistor Q609 through MUTING switch S203. Since this voltage is so low Q609 cannot conduct and complete the emitter circuit of transistor Q608. This prevents Q608 from amplifying the detector output.

When tuned to a signal, the opposite actions occur. I-f signal through capacitor C227 is rectified into negative d-c voltage by diodes D207 and D208. This voltage cuts off transistor Q206 and eventually turns on transistor Q609, thereby enabling transistor Q608 to amplify the detector output. The muting level can be adjusted by potentiometer VR901. The muting level is usually set approximately 20 dB

lower than the signal level. If the receiver tuning is shifted within range B of Fig. 1-4, the difference between the collector voltages of transistors Q211 and Q212 becomes large enough drops across resistors R251 and R252, thus lowering the base voltage of PNP transistor Q209 and results in its conduction. As before, the conduction of Q209 begins a chain of events which prevents Q608 from amplifying. If the tuning is shifted within range C of Fig. 1-4, the difference between the collector voltages of transistors Q211 and Q212 is so small that transistor Q210 is turned off within this range as well as in range A. Noise components caused by detuning, however, are coupled to transistor Q207 through capacitor C240 and resistor R247 from the detector output.

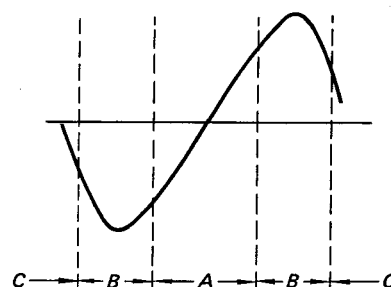


Fig. 1-4 Discriminator characteristic

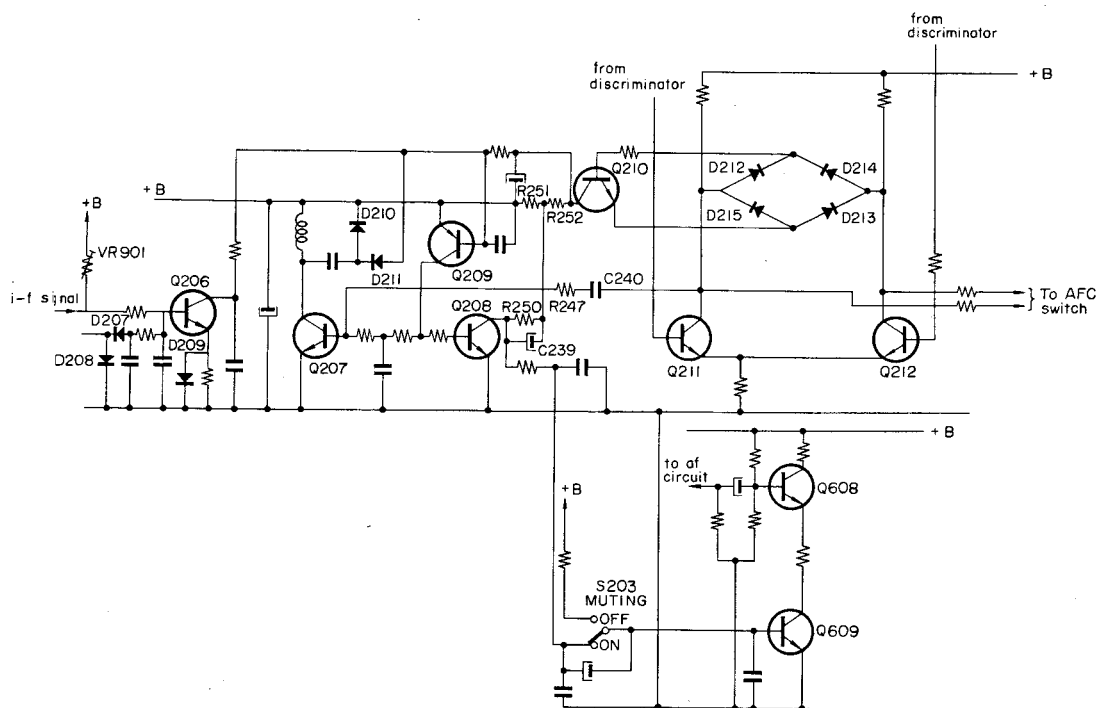


Fig. 1-3

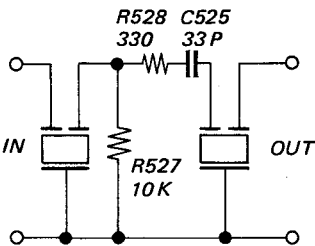
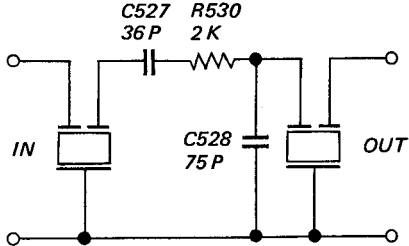
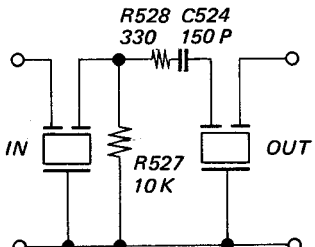
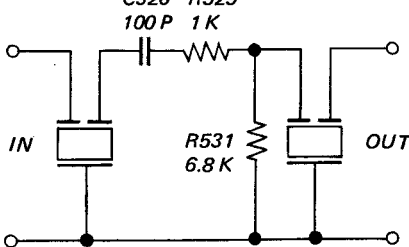
The noise is amplified, rectified into negative d-c voltage by diodes D210 and D211, and applied to the base of transistor Q209 to turn it on. Since the base voltage of Q207 is controlled by the collector voltage of Q209, the amplification of transistor Q207 increases due to increased base bias, and transistor Q209 is held conducting quite reliably. As before, transistor Q608 cuts off the detector output.

Positive feedback through resistor R250 and capacitor C239 from transistor Q209 aids in turning off Q208.

Adjustable Selectivity Employing Ceramic Filters:

The bandwidth in a-m reception can be altered by changing the coupling between the sections of ceramic filters in the a-m i-f circuit. Ceramic filters CF501 and CF502 can be manually set to narrow or wide bandwidth by switch S501.

The net result of the switch manipulations on the ceramic filter circuits are summarized in Table. The overall selectivity curves of the a-m i-f strip are shown in Fig. 1-5.

Band width	CF501 (S501-1)	CF502 (S501-2 ~ 3)	Overall response (Fig. 1-5)
Sharp			A
Broad			B

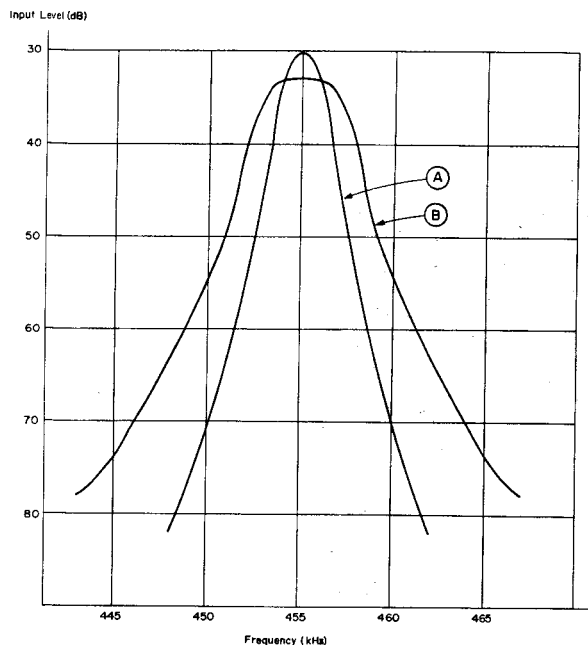


Fig. 1-5 Overall i-f response curve

ANL (Automatic Noise Limiter):

This limiter in the a-m section clips any noise pulses accompanying the signal to a level no longer than the signal amplitude. The clipping level is automatically adjusted to match the variations in signal level. The collector voltage of i-f amplifier Q502 forward biases diodes D504 and D505 through resistors R509 and R521, while the output voltage of detector D501 provides a reverse-bias voltage (Fig. 1-6). These two bias voltages adjust the clipping level of diodes D504 and D505 to match the average signal level.

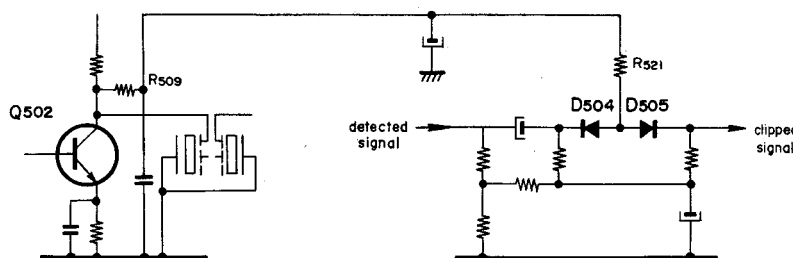


Fig. 1-6 Automatic noise limiter circuit

Product Detector for Single-Sideband Reception:

A product detector is a type of heterodyne detector. Single-sideband signals can be recovered by passing them through nonlinear device after being mixed with a carrier identical in frequency to that used during modulation at the transmitter. That is, these two signals, sideband and carrier, are converted into two beat signals, upper and lower, against the carrier frequency by heterodyne action. The upper beat signal is eliminated by passing through the filter circuit and the lower beat signal is fed to the next stage as audio signals.

In the model CRF-230B, the detector utilizes the square-law characteristic (output current proportional to the square of the effective value of the input voltage) of a diode for the nonlinear device.

To minimize distortion, two diodes D502 and D503 are connected in reverse each other and applied the signals respectively positive in phase. That is because the range of square-law curve of one diode is narrow causing distorted detection for strong input signal.

The BFO injection voltage used for carrier reinsertion is comparatively high (about 0.8 volt is optimum) to set the operating point of the detector within a linear portion of the diodes' characteristic. This results to minimize distortion of the recovered audio signal.

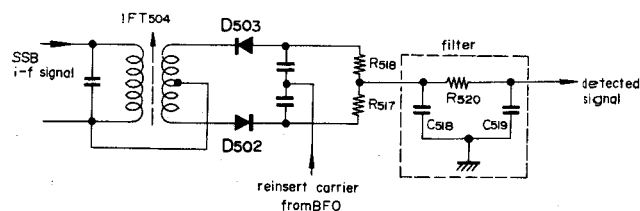


Fig. 1-7 Production detector

1-5. EXTERNAL VIEW

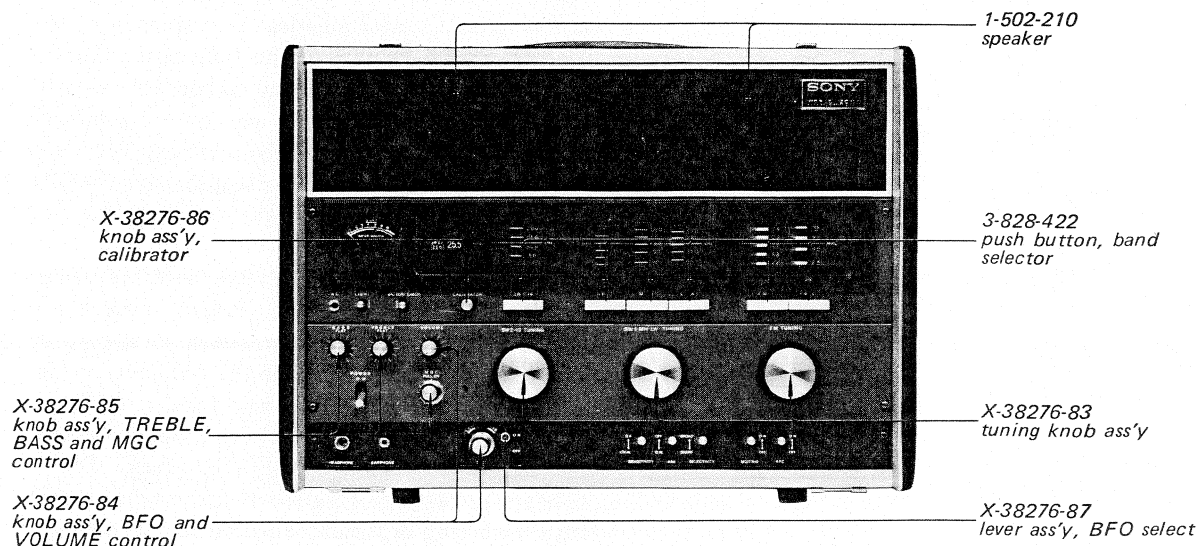


Fig. 1-8.

1-6. INTERNAL VIEW

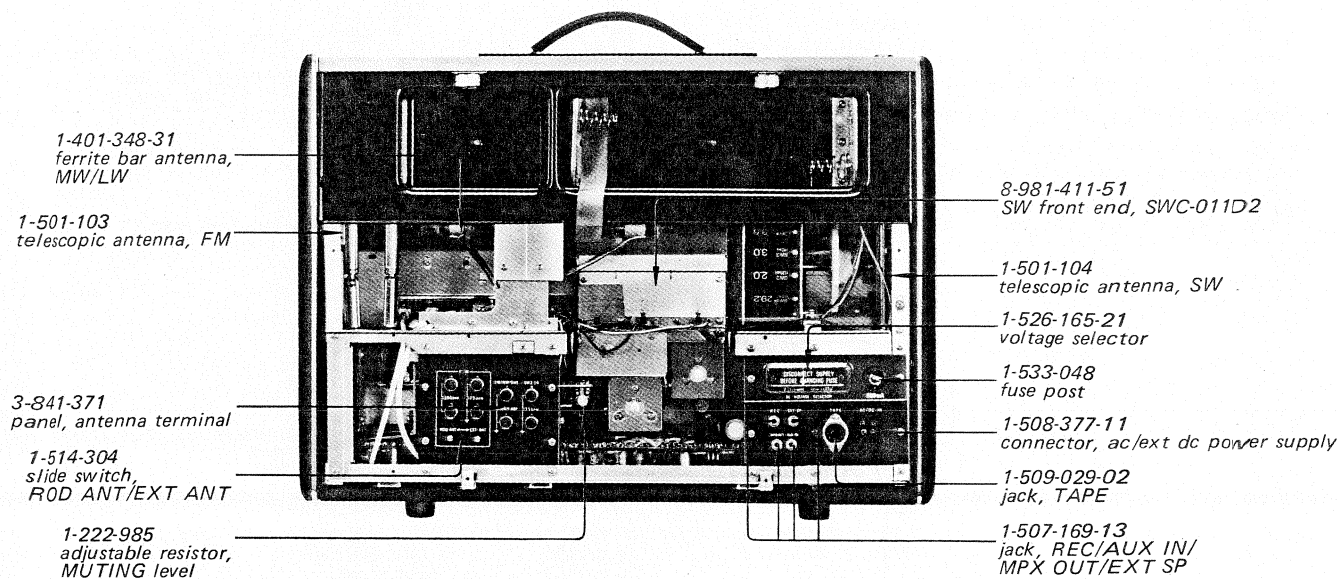
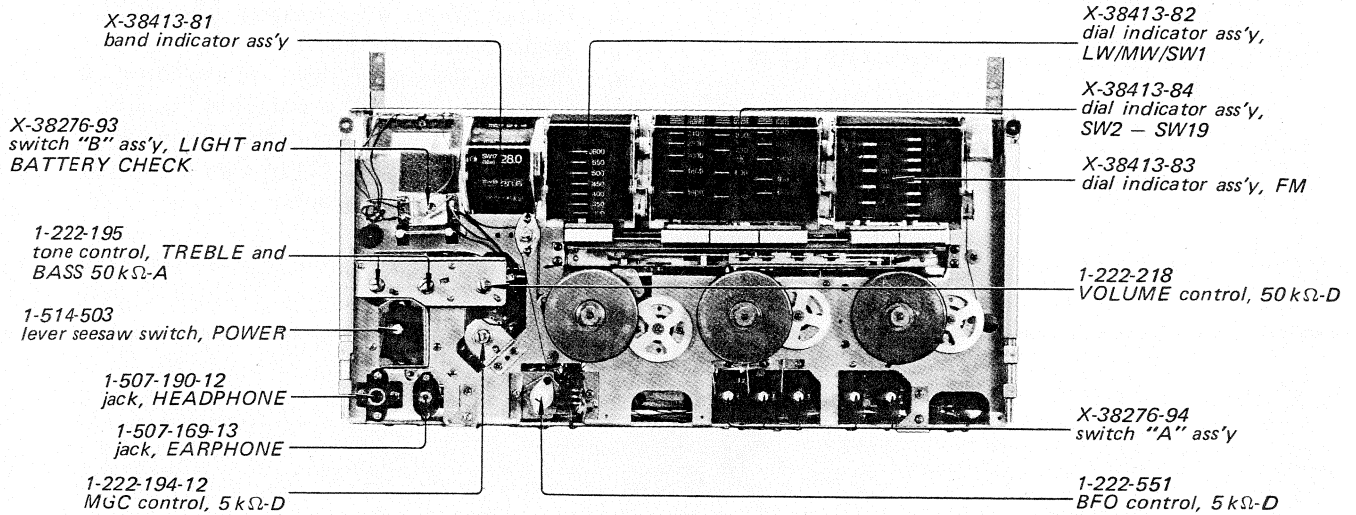


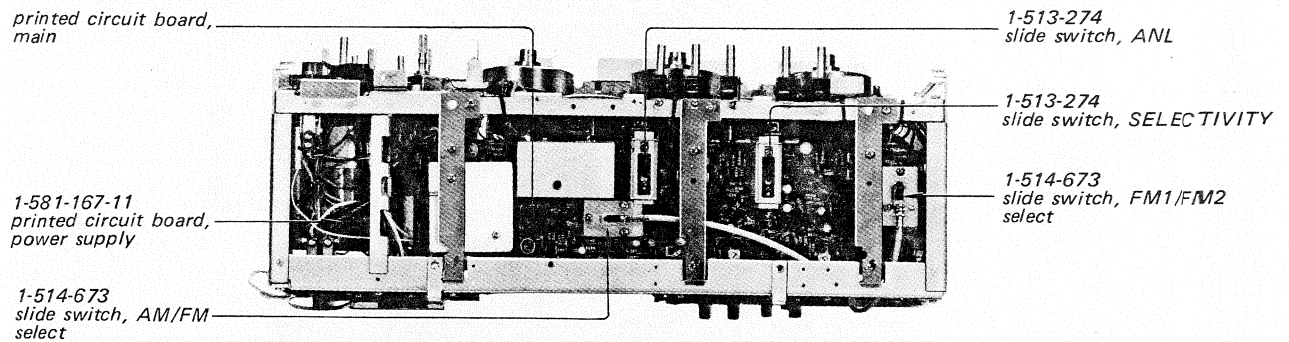
Fig. 1-9.

1-7. CHASSIS VIEW

— Front —



— Bottom —



SECTION 2 DISASSEMBLY

2-1. REAR COVER REMOVAL

1. Remove the six screws marked (A) in Fig. 2-1.
2. Remove the rear cover in the direction shown by the arrow (B).
3. Remove the two wood screws marked (C) in Fig. 2-1.

2-2. CABINET REMOVAL

1. Remove the four screws marked (E) in Fig. 2-1.
2. Push up the three telescopic antennas' bottom.
3. Remove the six screws marked (F) and (G) in detail (1) and (3) of Fig. 2-1.
4. Unsolder the coaxial cable and the three lead wires shown in detail (1) and (3) of Fig. 2-1.
5. Loosen the three set screws fixing band selector knob shown in detail (2) of Fig. 2-1 and pull out the band selector knob.

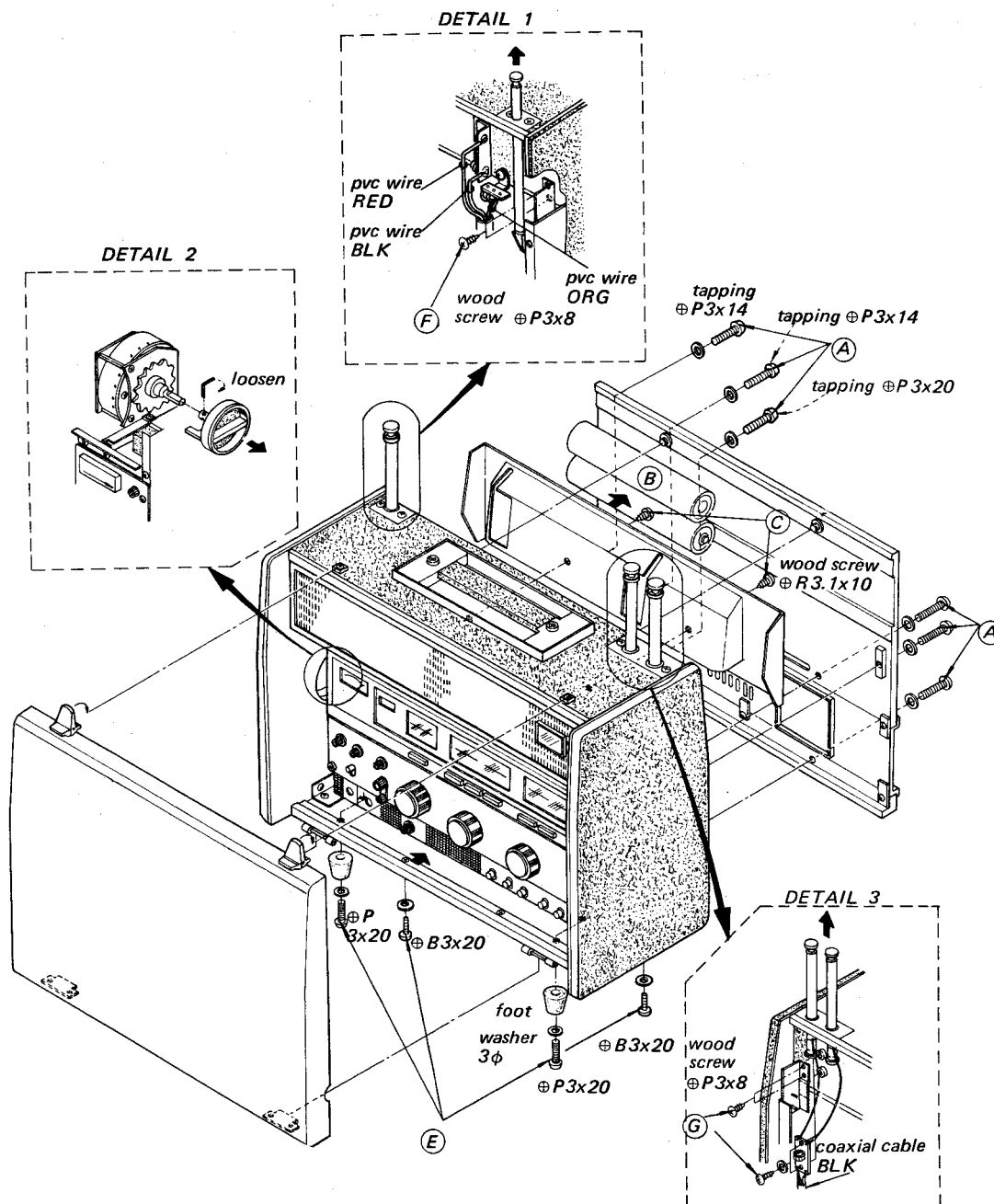


Fig. 2-1

2-3. FRONT PANEL REMOVAL

1. Remove the three TUNING knobs and the CALIBRATOR knob by loosening their set-screws.
2. Pull out the five control knobs marked * in Fig. 2-2.
3. Remove the six screws marked (H) and remove the main panel and the sub-panel.

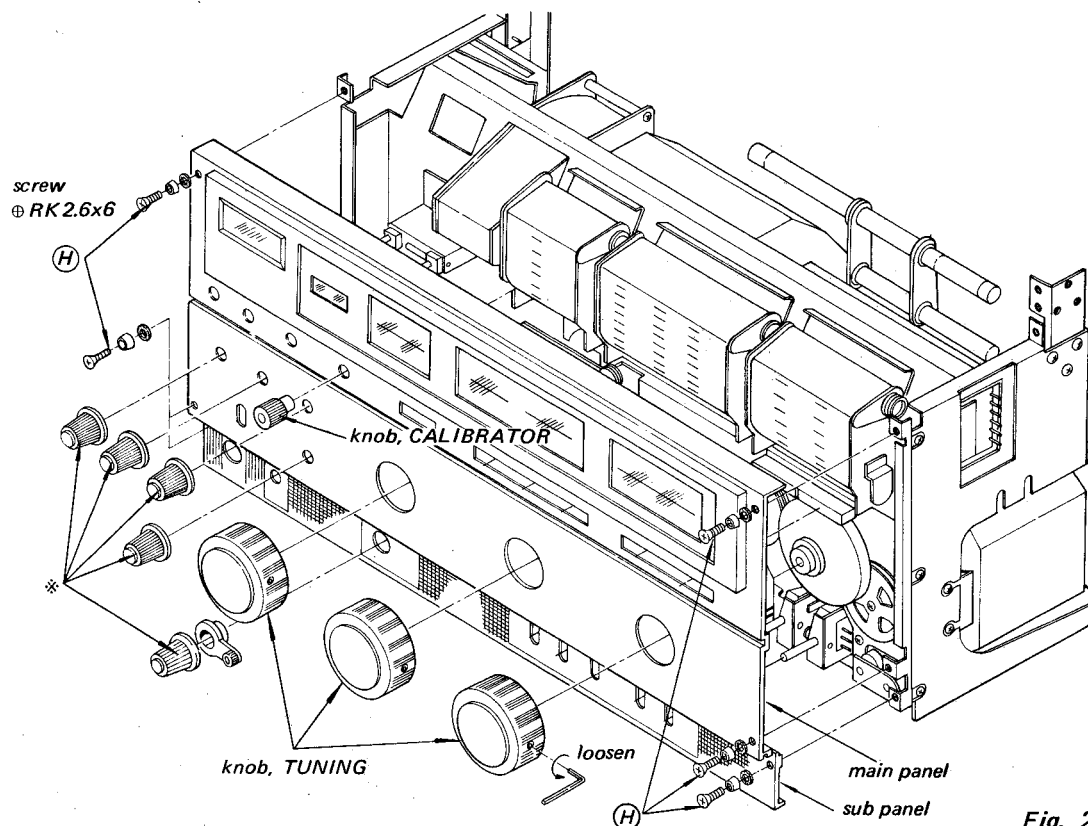


Fig. 2-2

2-4. SPEAKER REMOVAL

1. Remove the rear cover and battery case.
2. Remove the three truss head screws marked (I) in Fig. 2-3.
3. Now, baffle board and two speakers are removable as shown in Fig. 2-3.

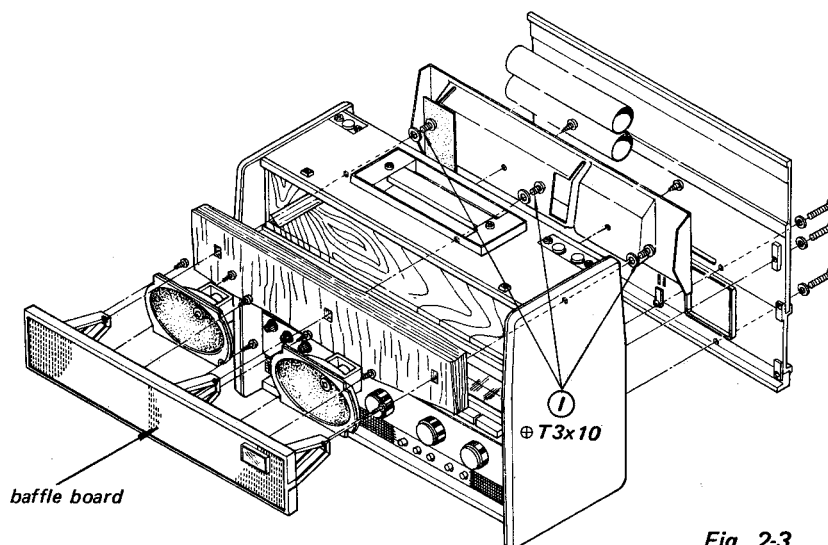


Fig. 2-3

2-5. FM FRONT END BLOCK REMOVAL

1. Remove the thirteen screws shown in Fig. 2-4.
2. Remove the antenna terminal panel.
3. Loosen the two screws marked * in Fig. 2-5, which hold the tuning shaft.
4. Remove the screw shown in Fig. 2-6.
5. Remove the two fm front-end blocks in the direction shown by the arrows in Fig. 2-7.

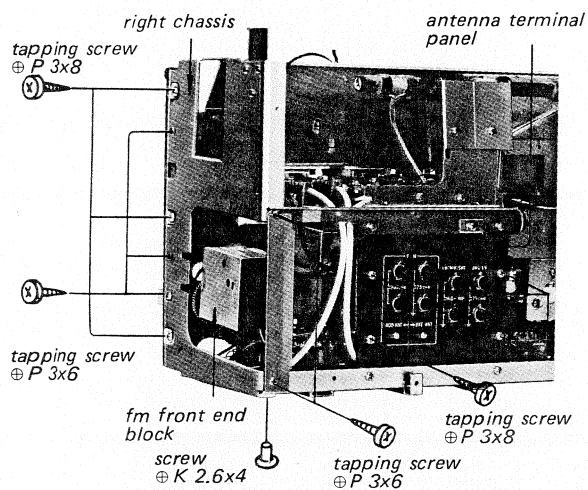


Fig. 2-4

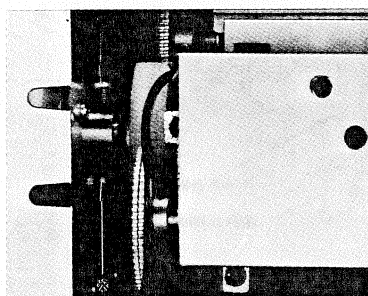


Fig. 2-5

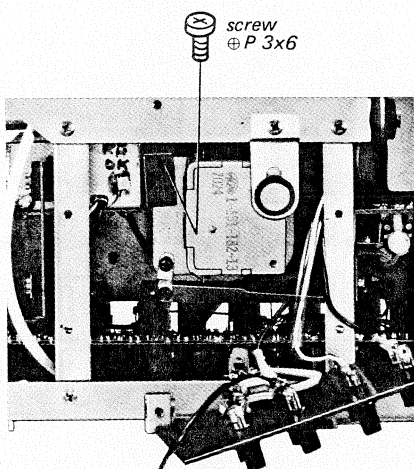


Fig. 2-6

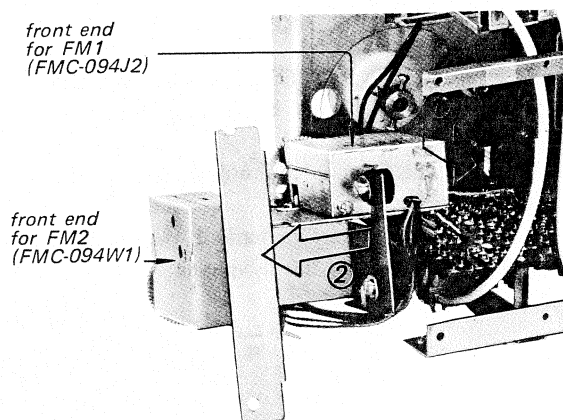


Fig. 2-7

2-6. MAIN CIRCUIT BOARD REMOVAL

1. Remove the two slide switches with lever springs by removing the two screws marked ▲ in Fig. 2-8.
2. Remove the three screws marked ⊙.
3. Remove the main circuit board as shown in Fig. 2-9.

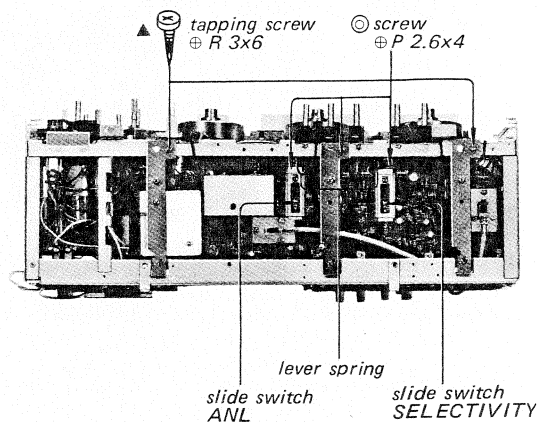
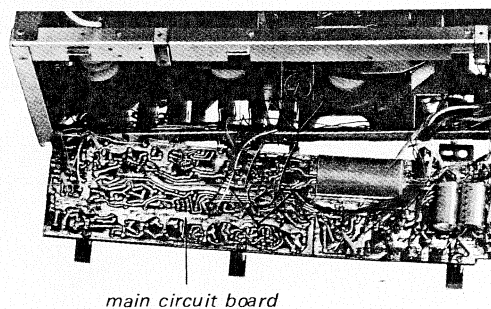


Fig. 2-8



main circuit board

Fig. 2-9

2-7. SW FRONT END BLOCK REMOVAL

1. Unsolder the five wires shown in Fig. 2-10.
2. Remove the four screws shown in Fig. 2-11.
3. Loosen the two screws marked ★ in Fig. 2-12 which fix the friction disk.

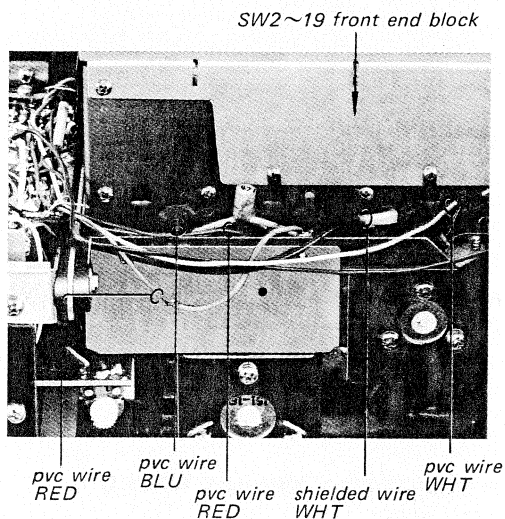


Fig. 2-10

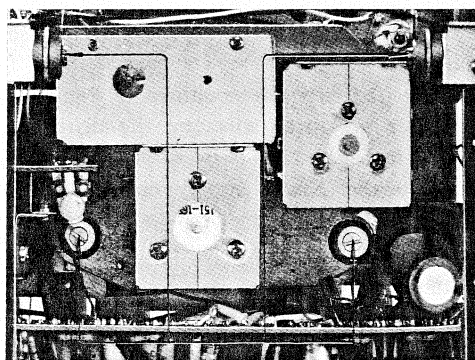


Fig. 2-11

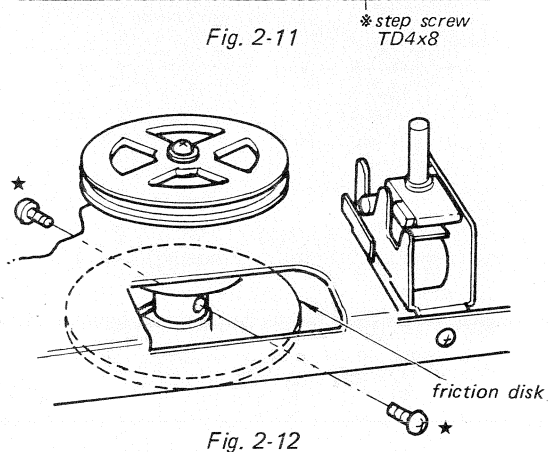


Fig. 2-12

4. Sw front-end block can be removed in the direction shown by the arrow in Fig. 2-13.

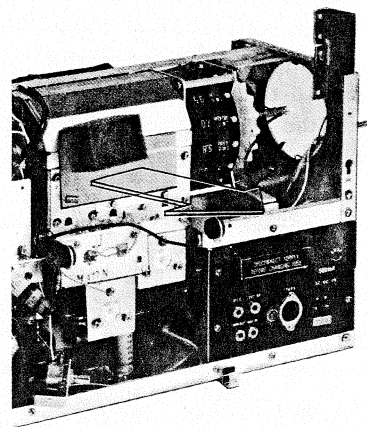


Fig. 2-13

2-8. CP CIRCUIT BOARD REMOVAL

1. Remove the eight screws shown in Fig. 2-14 and remove the bar antenna holder and antenna terminal panel.

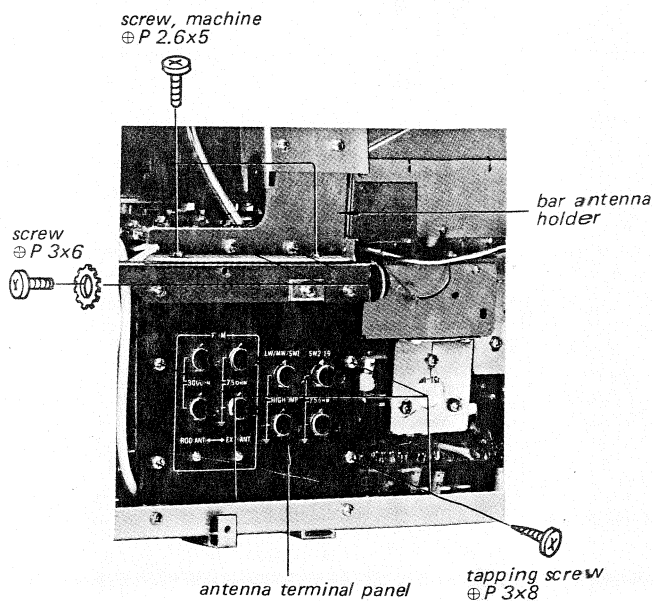


Fig. 2-14

2. Remove the two screws shown in Fig. 2-15.
3. Unsolder the two wires at the antenna terminal panel.
4. Unsolder the six tuning capacitor lead wires.
5. Unsolder the three wires which come from the sw front end as shown in Fig. 2-16.
6. Unsolder all the wires shown in Fig. 2-17.
7. Remove the circuit board in the direction shown by the arrow in Fig. 2-15.

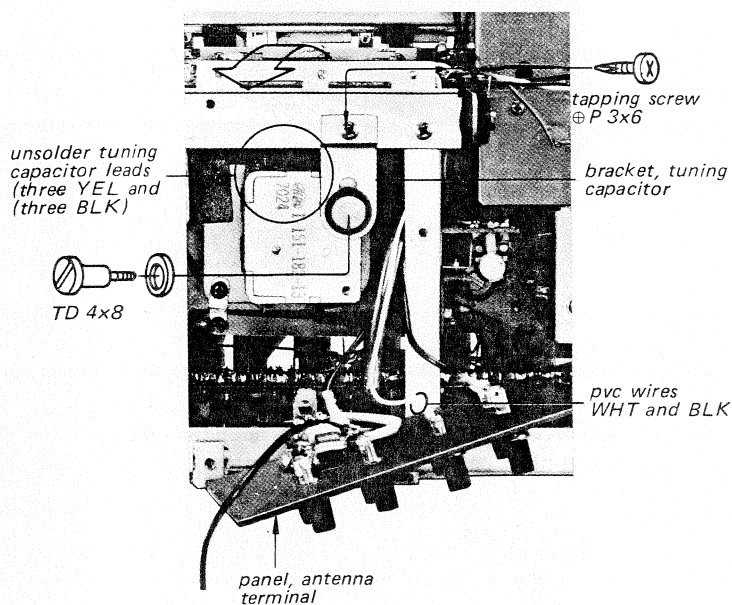


Fig. 2-15

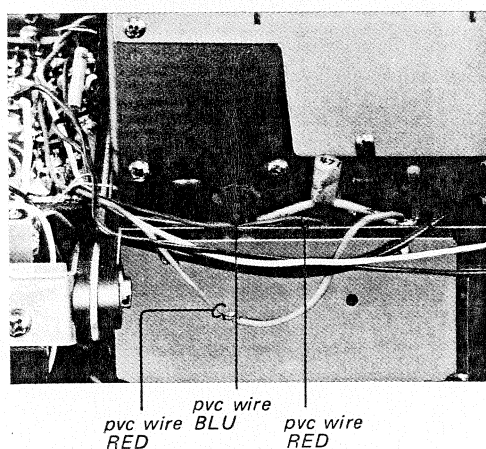


Fig. 2-16

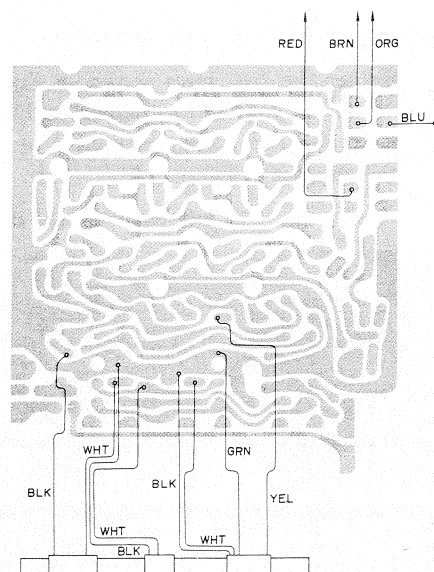


Fig. 2-17

2-9. POWER SUPPLY CIRCUIT BOARD REMOVAL

1. Remove the 19 screws shown in Fig. 2-18.
2. Remove the four jack nuts.
3. Unsolder all the wires on the terminal strip shown in Fig. 2-19.
4. Remove the two screws shown in Fig. 2-20.
5. Unsolder the three wires on the light switch shown in Fig. 2-21.
6. Remove the power supply circuit board as shown in Fig. 2-22.

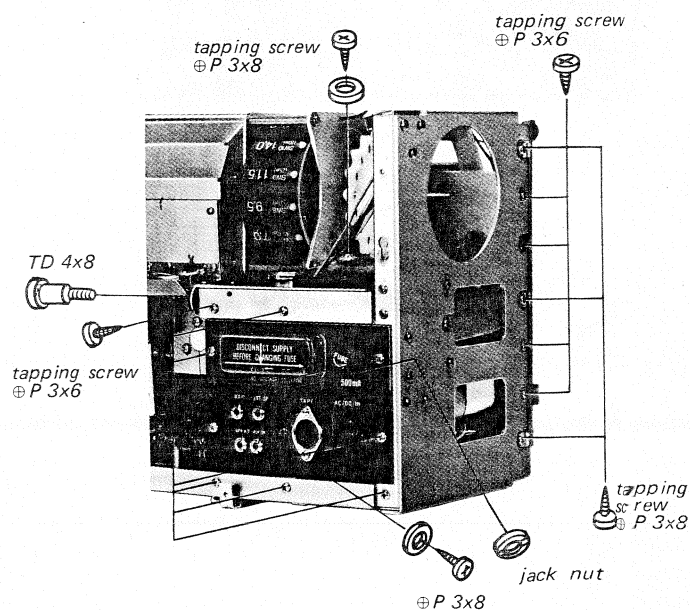


Fig. 2-18

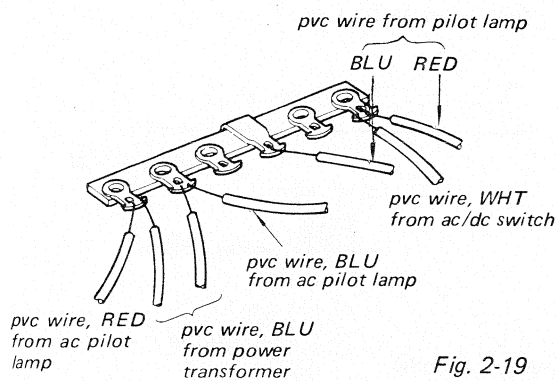


Fig. 2-19

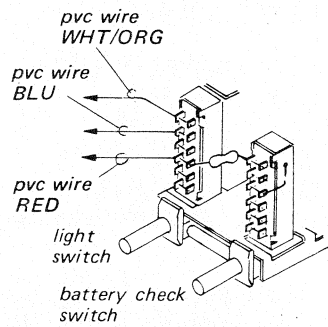


Fig. 2-21

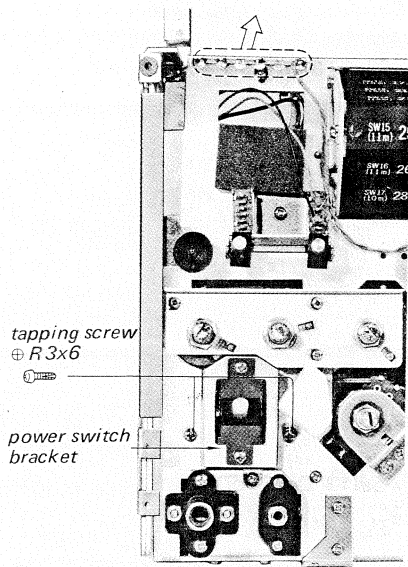


Fig. 2-20

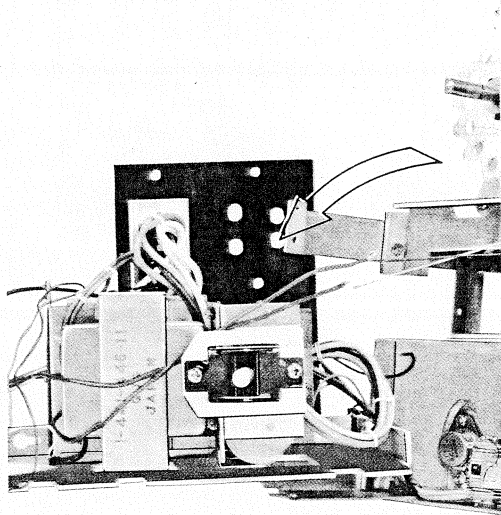


Fig. 2-22

2-10. DIAL CORD STRINGING

Dial cord and dial film is shown in Fig. 2-23.

dial cord Part No. 7-633-120-52

dial cord [1] : FM1/FM2

dial cord [2] : MW/LW/SW1

dial cord [3] : SW2-SW19

dial cord [4], [5]: SW2-SW19 calibrator

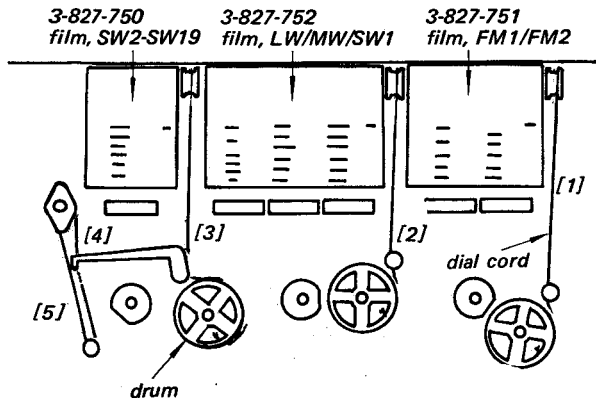


Fig. 2-23

2. MW/LW/SW1 Dial Cord

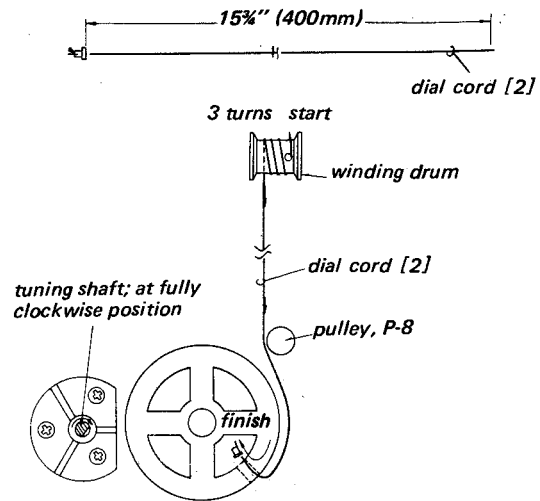


Fig. 2-25

1. FM1/FM2 Dial Cord

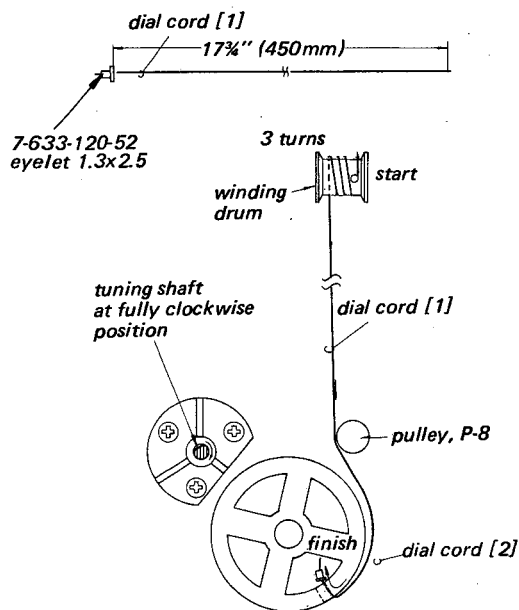


Fig. 2-24

3. SW2~SW19 Dial Cord

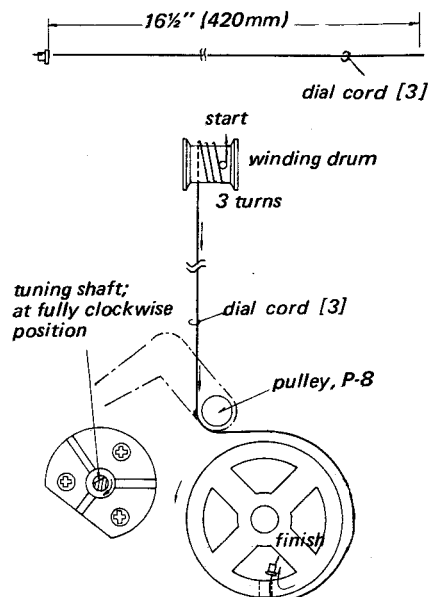


Fig. 2-26

4. SW2 ~ SW19 Tuning Capacitor Driving Cord

String the cord by removing the SW2-SW19 front end block from the chassis.

Dial Film Setting

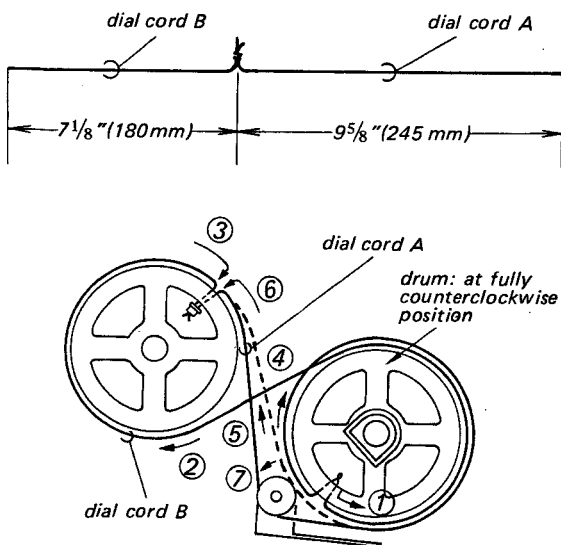


Fig. 2-27

5. SW2 ~ SW19 Calibrator Dial Cord

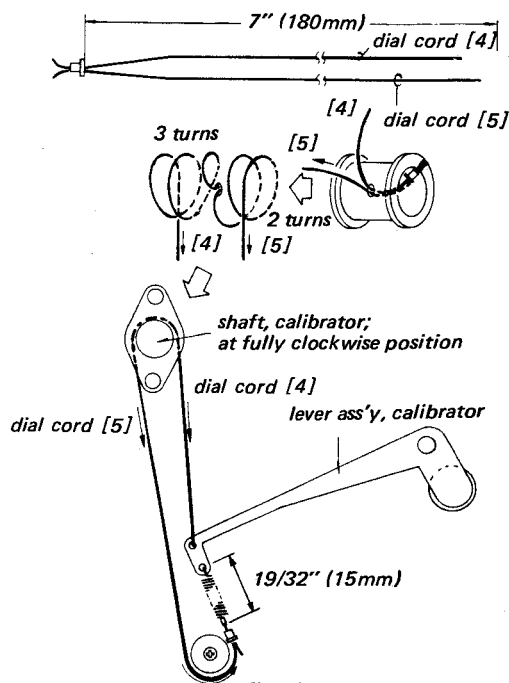


Fig. 2-28

6. Dial Film Setting

1. Set the top of dial film to the film-drum as shown in Fig. 2-29 (step ①).
2. Attach the other end of dial film with an adhesive tape (step ②).
3. Turn the ratchet-wheel four turns in the direction shown by the arrow (step ③).
4. Set the side mark of the film on the film setting position. After setting the film you must keep the film with fingers or adhesive tape so that the film does not move.
5. String the dial cord as shown in Fig. 2-29 (step ⑤).

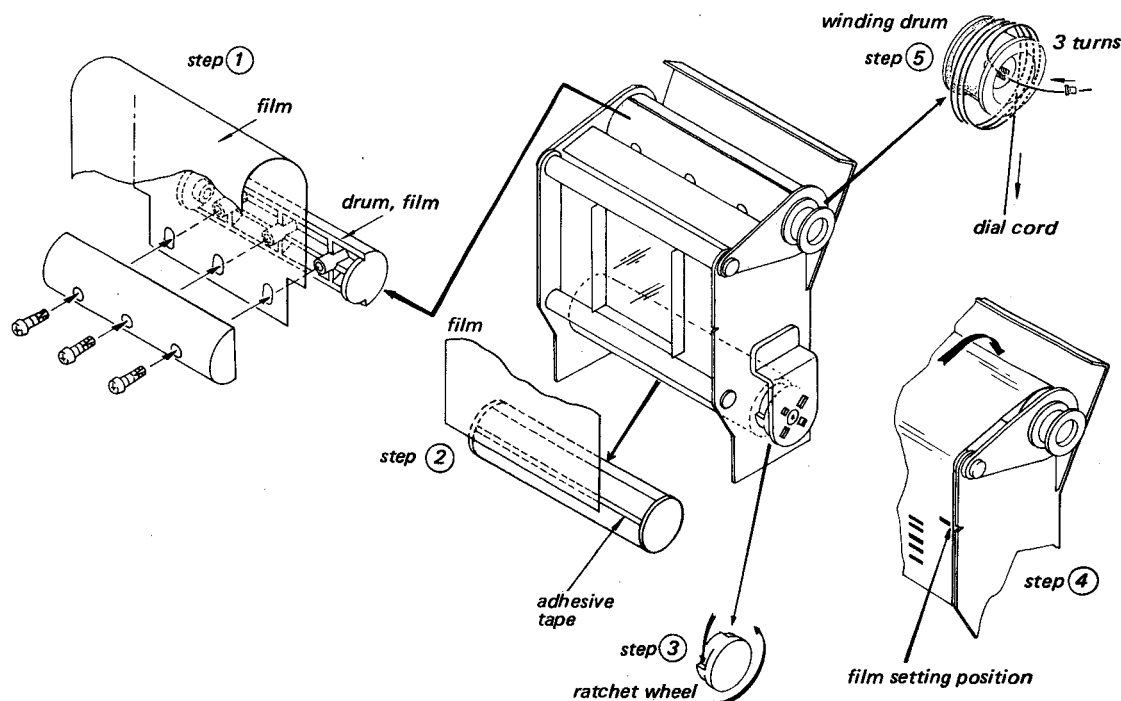


Fig. 2-29

SECTION 3 CIRCUIT ADJUSTMENTS

3-1. PREPARATION

1. Power Supply

At circuit adjustment remove the cabinet and front panel, and supply dc 9V across the red and the black lead wires shown in Fig. 3-1.

2. Receiver Control Setting

Set control knobs as follows except noted in each adjustment.

- * VOLUME Control : Maximum
- * BASS Control : FLAT
- * TREBLE Control : FLAT
- * SENSITIVITY : DX
- * SELECTIVITY : SHARP
- * ANL : OFF
- * BFO : OFF
- * AFC : OFF
- * MUTING : OFF

3. Test Equipment/Tools Required

- * Rf Signal Generator
- * 10.7 MHz Sweep/Marker Generator
- * Loop Antenna
- * Oscilloscope
- * VTVM
- * 0.01 μ F ceramic capacitor
- * 4 Ω Resistor
- * Screwdriver For Alignment

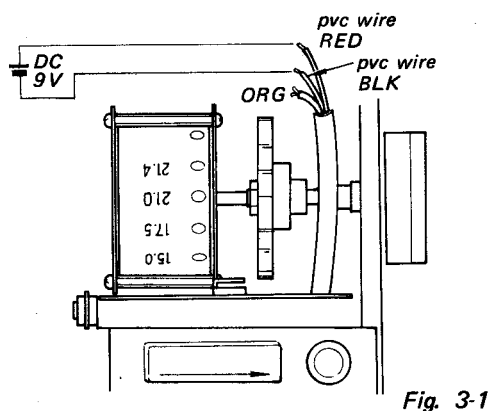


Fig. 3-1

3-2. AM IF ALIGNMENT

Preparation:

- Band Selector: MW
- Rf Signal Generator Coupling: Loop antenna (See Fig. 3-2)
- Modulation: 1-kHz 30% amplitude-modulated signal

VTVM Connection:

To EXT SP jack in parallel with 4 Ω resistor

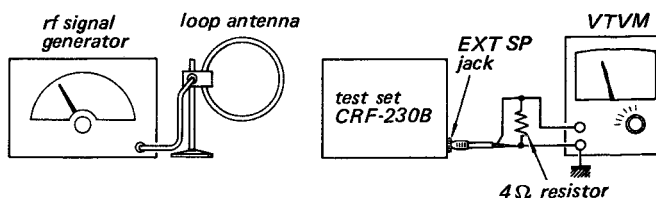


Fig. 3-2 A-m i-f alignment setup

Rf Signal Generator Frequency	Adjust	Remarks
455 kHz	IFT 401 IFT 501 IFT 502 IFT 504	Adjust for maximum meter reading on VTVM.

Note: IFT401 is on the cp circuit board.
See Fig. 3-13 on page 25.

3-3. SSB DETECTOR ADJUSTMENT

Preparation:

- Band Selector: MW
- SELECTIVITY switch: SHARP
- BFO Switch: ON
- BFO Knob: Mechanical mid position
- Rf Signal Generator Coupling: Loop antenna
- Setup: See Fig. 3-3.

Note: Be sure that a-m i-f section is aligned for the normal operating condition before adjusting ssb detector.

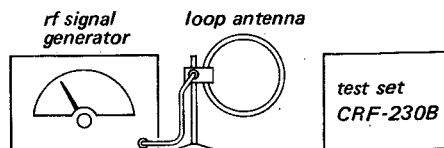


Fig. 3-3 Ssb detector adjustment setup

Rf Signal Generator Frequency	Adjust	Remarks
455 kHz unmodulated signal	BFO osc coil LT 801	Adjust for zero beat hearing

34. FM IF ALIGNMENT

Test Equipment/Tools Required

- * 10.7 MHz Sweep/Marker Generator
- * Oscilloscope
- * 1 kΩ carbon type resistor
- * Screwdriver for Alignment

Preparation:

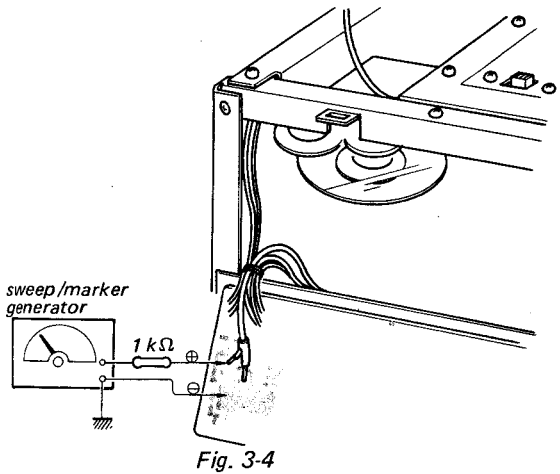
Sweep/Marker Generator Connection:
On the main circuit board with 1 kΩ resistor in series (See Fig. 3-4).

Oscilloscope Connection: MPX OUT jack

Sweep Generator Center Frequency:
10.7 MHz

Marker Generator Center Frequency:
10.7 MHz

Band Selector: FM2



Procedure:

1. Turn the core of discriminator transformer (IFT 204) fully counterclockwise.
2. Turn the core of fm i-f transformer (IFT 201, IFT 202) and discriminator transformer (IFT 203) to obtain the maximum amplitude response curve shown in Fig. 3-5.
3. Turn the core of discriminator transformer (IFT 204) to obtain the S curve response shown in Fig. 3-6.

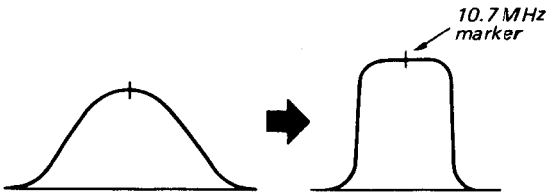


Fig. 3-5 Response curve

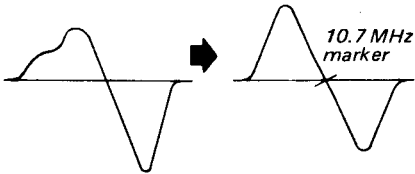
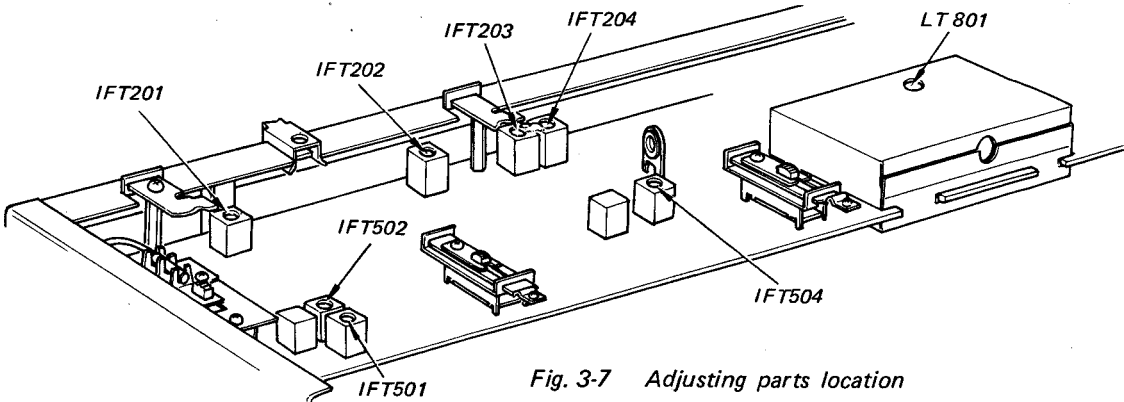


Fig. 3-6 "S" curve

Sweep/Marker Generator Coupling	Sweep/Marker Generator Frequency	Oscilloscope Connection	Adjust	Remarks
On the main circuit board with 1 kΩ resistor in series. (See Fig. 3-4)	10.7 MHz	MPX OUT jack	IFT201 IFT202 IFT203 IFT204	Band Selector: FM 2 AFC Switch: off Adjust for maximum amplitude and symmetrical S curve on the scope.



3-5. MUTING LEVEL SETTING

Preparation:

- Band Selector: FM1
- MUTING Switch: ON
- ROD ANT-EXT ANT Switch: EXT ANT
- Rf signal Generator Connection:
 - To FM EXT ANT terminal (75 Ω)
- VTVM Connection:
 - To EXT SP jack in parallel with 4 Ω resistor
- Modulation:
 - Fm 400-Hz $\pm$ 22.5-kHz frequency-modulated signal (rf signal: 77.5 MHz)

Note: Be sure that fm i-f section is operating in normal condition before setting the muting level.

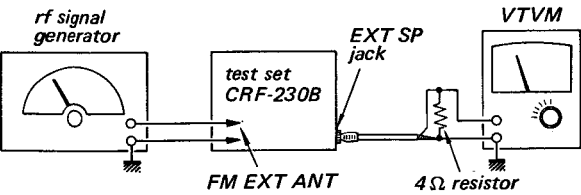


Fig. 3-8 Muting level setting setup

Procedure:

1. Detune from rf signal.
2. Turn the muting level adjustable resistor VR901 fully counterclockwise.
3. Gradually turn VR901 clockwise and set it at the position that the VTVM shows minimum indication.

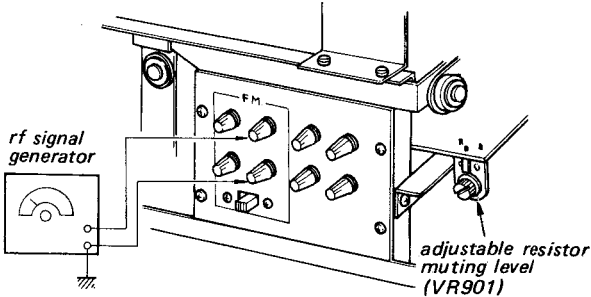


Fig. 3-9 Rf signal generator connection and parts location

Rf Signal Generator Frequency	Receiver Dial Setting	Adjust
77.5 MHz	90 MHz (Detune from rf signal of 77.5 MHz)	Muting level adjustable resistor VR901

3-6. FM1/FM2 FREQUENCY COVERAGE ADJUSTMENT

Preparation:

- ROD ANT-EXT ANT Switch: EXT ANT
- Rf Signal Generator Coupling:
 - Direct connection across FM EXT ANT terminal (75 Ω)
- Rf Signal Modulation:
 - 400-Hz $\pm$ 22.5-kHz frequency-modulated signal
- VTVM Connection:
 - To EXT SP jack in parallel with 4 Ω resistor

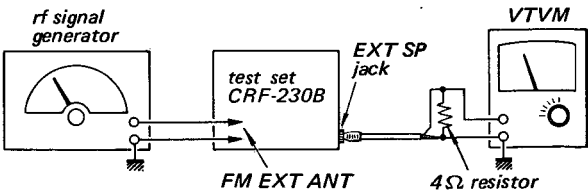


Fig. 3-10 FM1/FM2 frequency coverage and tracking adjustment setup

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
FM 1 Frequency Coverage	75 MHz	Fully counter-clockwise	FM 1 osc coil L04	Band Selector: FM 1 Adjust for maximum meter reading on VTVM.
	91.5 MHz	Fully clockwise	FM 1 osc trimmer CT01-4	
FM 2 Frequency Coverage	86.5 MHz	Fully counter-clockwise	FM 2 osc coil L104	Band Selector: FM 2 Adjust for maximum meter reading on VTVM.
	109.5 MHz	Fully clockwise	FM 2 osc trimmer CT101-4	

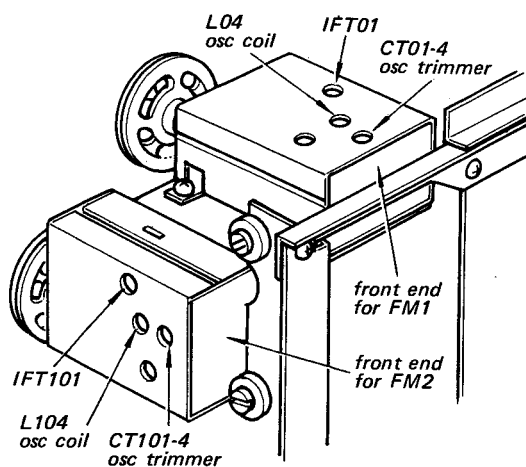


Fig. 3-11 Adjusting parts location

Note:

1. The special test equipment required for tracking adjustment makes this strictly a factory adjustment.
2. IFT 01 and IFT 101 (shown in Fig. 3-11) are to be adjusted for i-f alignment. Adjust IFT 01 (with FM1 band) and IFT 101 (with FM2 band) for maximum meter reading on VTVM with the same setup of FM1/FM2 frequency coverage adjustment.

3-7. LW/MW/SW1 FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation:

Rf Signal Generator Coupling:

Loop antenna

Rf Signal Modulation:

1-kHz 30% amplitude-modulated signal

VTVM Connection:

To EXT SP jack in parallel with 4Ω load resistor

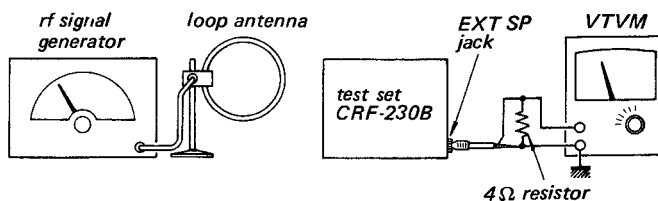


Fig. 3-12 LW/MW/SW1 frequency coverage and tracking adjustment setup

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
LW Frequency Coverage	145 kHz	Fully counterclockwise	LW osc coil L409	Band Selector: LW
	410 kHz	Fully clockwise	LW osc trimmer CT409	
LW Tracking	160 kHz	Tune to 160 kHz signal	LW ant coil L403, LW rf coil L406	Adjust for maximum meter reading on VTVM.
	360 kHz	Tune to 360 kHz signal	LW ant trimmer CT403, LW rf trimmer CT406	
MW Frequency Coverage	520 kHz	Fully counterclockwise	MW osc coil L408	Band Selector: MW
	1,680 kHz	Fully clockwise	MW osc trimmer CT408	
MW Tracking	620 kHz	Tune to 620 kHz signal	MW ant coil L402, MW rf coil L405	Adjust for maximum meter reading on VTVM.
	1,400 kHz	Tune to 1,400 kHz signal	MW ant trimmer CT402, MW rf trimmer CT405	
SW1 Frequency Coverage	1,550 kHz	Fully counterclockwise	SW1 osc coil L407	Band Selector: SW1
	4,600 kHz	Fully clockwise	SW1 osc trimmer CT407	
SW1 Tracking	1,800 kHz	Tune to 1,800 kHz signal	SW1 ant coil L401, SW1 rf coil L404	Adjust for maximum meter reading on VTVM.
	4,200 kHz	Tune to 4,200 kHz signal	SW1 rf trimmer CT404	

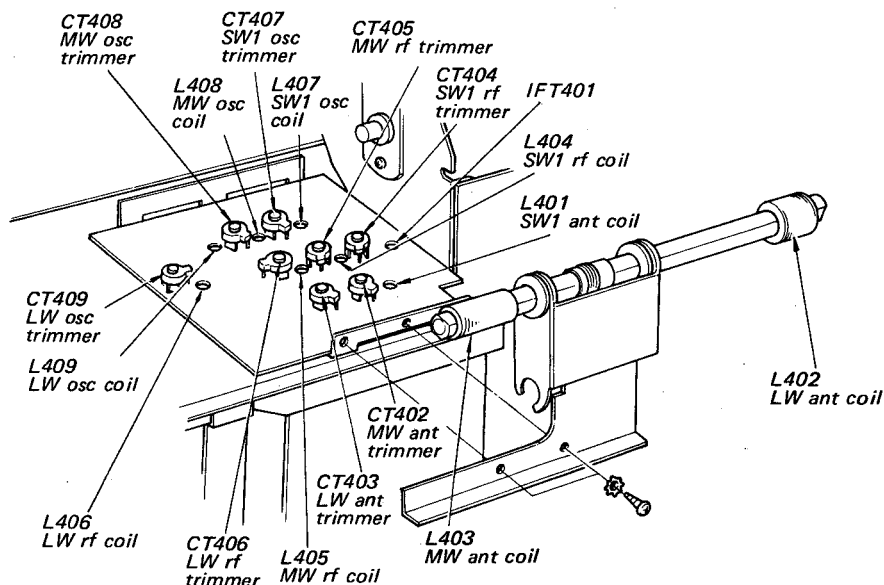


Fig. 3-13 Adjusting parts location

3-8. SW2-SW19 1st IF ALIGNMENT, FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation:

Rf Signal Modulation:

1-kHz 30% amplitude-modulation

Rf Signal Generator Coupling:

To hermetic terminal HT304 with 0.01 μ F ceramic capacitor

VTVM Connection:

Across the coaxial cable (to cp circuit board) through the 455-kHz amplifier

DC 4.5V Supply:

To feed-through capacitor CP305

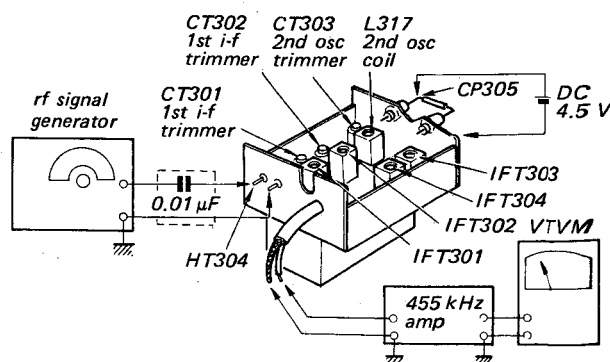


Fig. 3-14

Adjustment Item	Rf Signal Generator Frequency	Adjust	Remarks
Frequency Coverage	1.6 MHz	2nd osc coil L317	Adjust for maximum meter reading.
	2.2 MHz	2nd osc trimmer CT303	
Tracking	1.6 MHz	IFT 301 IFT 302	- ditto -
	2.2 MHz	CT301 CT302	
I-f Alignment	1.6 MHz ~ 2.2 MHz	IFT 303 IFT 304	- ditto -

3-9. SW2 ~ SW19 FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Preparation:

Rf Signal Modulation:

1-kHz 30% amplitude-modulated signal

Rf Signal Generator Coupling:

Direct connection across the antenna terminal SW2 ~ 19

VTVM Connection:

To EXT SP jack in parallel with 4Ω load resistor

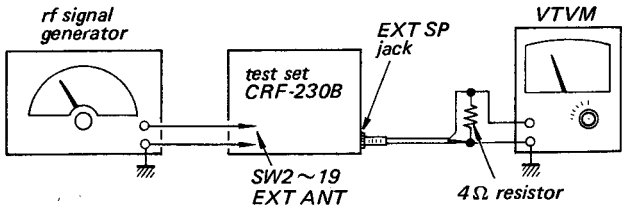


Fig. 3-15 SW2 ~ SW19 frequency coverage and tracking adjustment setup

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 2 Frequency Coverage	2.0 MHz	Fully counterclockwise	SW 2 osc coil L324	Band Selector: SW 2
SW 2 Tracking	2.1 MHz	Tune to 2.1 MHz signal	SW 2-4 ant coil L301, SW 2-4 rf coil L307	
	2.5 MHz	Tune to 2.5 MHz signal	SW 2 ant trimmer CT304, SW 2 rf trimmer CT322	
SW 3 Frequency Coverage	3.0 MHz	Fully counterclockwise	SW 3 osc coil L325	Band Selector: SW 3
SW 3 Tracking	3.5 MHz	Tune to 3.5 MHz signal	SW 3 ant trimmer CT305, SW 3 rf trimmer CT323	
SW 4 Frequency Coverage	3.5 MHz	Fully counterclockwise	SW 4 osc coil L326	Band Selector: SW 4
SW 4 Tracking	4.0 MHz	Tune to 4.0 MHz signal	SW 4 ant trimmer CT306, SW 4 rf trimmer CT324	
SW 5 Frequency Coverage	4.5 MHz	Fully counterclockwise	SW 5 osc coil L327	Band Selector: SW 5
SW 5 Tracking	4.6 MHz	Tune to 4.6 MHz signal	SW 5-7 ant coil L302, SW 5-7 rf coil L308	
	5.0 MHz	Tune to 5.0 MHz signal	SW 5 ant trimmer CT307, SW 5 rf trimmer CT325 trimmer	
SW 6 Frequency Coverage	5.8 MHz	Fully counterclockwise	SW 6 osc coil L328	Band Selector: SW 6
SW 6 Tracking	6.3 MHz	Tune to 6.3 MHz signal	SW 6 ant trimmer CT308, SW 6 rf trimmer CT326	

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 7 Frequency Coverage	7.0 MHz	Fully counterclockwise	SW 7 osc coil L329	Band Selector: SW 7 Adjust for maximum meter reading on VTVM.
SW 7 Tracking	7.5 MHz	Tune to 7.5 MHz signal	SW 7 ant trimmer CT309, SW 7 rf trimmer CT327	
SW 8 Frequency Coverage	9.5 MHz	Fully counterclockwise	SW 8 osc coil L330	Band Selector: SW 8 Adjust for maximum meter reading on VTVM.
SW 8 Tracking	9.6 MHz	Tune to 9.6 MHz signal	SW 8-10 ant coil L303, SW 8-10 rf coil L309	
	10.0 MHz	Tune to 10.0 MHz signal	SW 8 ant trimmer CT310, SW 8 rf trimmer CT328	
SW 9 Frequency Coverage	11.5 MHz	Fully counterclockwise	SW 9 osc coil L331	Band Selector: SW 9 Adjust for maximum meter reading on VTVM.
SW 9 Tracking	12.0 MHz	Tune to 12.0 MHz signal	SW 9 ant trimmer CT311, SW 9 rf trimmer CT329	
SW 10 Frequency Coverage	14.0 MHz	Fully counterclockwise	SW 10 osc coil L332	Band Selector: SW 10 Adjust for maximum meter reading on VTVM.
SW 10 Tracking	14.5 MHz	Tune to 14.5 MHz signal	SW 10 ant trimmer CT312, SW 10 rf trimmer CT330	
SW 11 Frequency Coverage	15.0 MHz	Fully counterclockwise	SW 11 osc coil L333	Band Selector: SW 11 Adjust for maximum meter reading on VTVM.
SW 11 Tracking	15.1 MHz	Tune to 15.1 MHz signal	SW 11-13 ant coil L304, SW 11-13 rf coil L310	
	15.5 MHz	Tune to 15.5 MHz signal	SW 11 ant trimmer CT313, SW 11 rf trimmer CT331	
SW 12 Frequency Coverage	17.5 MHz	Fully counterclockwise	SW 12 osc coil L334	Band Selector: SW 12 Adjust for maximum meter reading on VTVM.
SW 12 Tracking	18.0 MHz	Tune to 18.0 MHz signal	SW 12 ant trimmer CT314, SW 12 rf trimmer CT322	

Adjusting Item	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 13 Frequency Coverage	21.0 MHz	Fully counterclockwise	SW 13 osc coil L335	Band Selector: SW 13
SW 13 Tracking	21.5 MHz	Tune to 21.5 MHz signal	SW 13 ant trimmer CT315, SW 13 rf trimmer CT333	Adjust for maximum meter reading on VTVM.
SW 14 Frequency Coverage	21.4 MHz	Fully counterclockwise	SW 14 osc coil L336	Band Selector: SW 14
SW 14 Tracking	21.5 MHz	Tune to 21.5 MHz	SW 14-16 ant coil L305, SW 14-16 rf coil L311	Adjust for maximum meter reading on VTVM.
	21.9 MHz	Tune to 21.9 MHz signal	SW 14 ant trimmer CT316, SW 14 rf trimmer CT334	
SW 15 Frequency Coverage	25.5 MHz	Fully counterclockwise	SW 15 osc coil L337	Band Selector: SW 15
SW 15 Tracking	26.0 MHz	Tune to 26.0 MHz signal	SW 15 ant trimmer CT317, SW 15 rf trimmer CT335	Adjust for maximum meter reading on VTVM.
SW 16 Frequency Coverage	26.8 MHz	Fully counterclockwise	SW 16 osc coil L338	Band Selector: SW 16
SW 16 Tracking	27.3 MHz	Tune to 27.3 MHz signal	SW 16 ant trimmer CT318, SW 16 rf trimmer CT336	Adjust for maximum meter reading on VTVM.
SW 17 Frequency Coverage	28.0 MHz	Fully counterclockwise	SW 17 osc coil L339	Band Selector: SW 17
SW 17 Tracking	28.1 MHz	Tune to 28.1 MHz signal	SW 17-19 ant coil L306, SW 17-19 rf coil L312	Adjust for maximum meter reading on VTVM.
	28.5 MHz	Tune to 28.5 MHz signal	SW 17 ant trimmer CT319, SW 17 rf trimmer CT337	
SW 18 Frequency Coverage	28.6 MHz	Fully counterclockwise	SW 18 osc coil L340	Band Selector: SW 18
SW 18 Tracking	29.1 MHz	Tune to 29.1 MHz	SW 18 ant trimmer CT320, SW 18 rf trimmer CT338	Adjust for maximum meter reading on VTVM.

Adjusting	Rf Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
SW 19 Frequency Coverage	29.2 MHz	Fully counterclockwise	SW 19 osc coil L341	Band Selector: SW 19
SW 19 Tracking	29.7 MHz	Tune to 29.7 MHz signal	SW 19 ant trimmer CT321, SW 19 rf trimmer CT339	Adjust for maximum meter reading on VTVM.

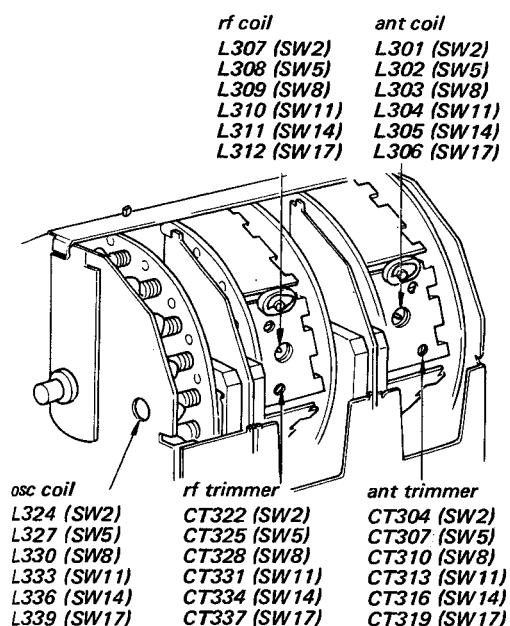


Fig. 3-16 Adjusting parts location for SW2, SW5, SW8, SW11, SW14 and SW17

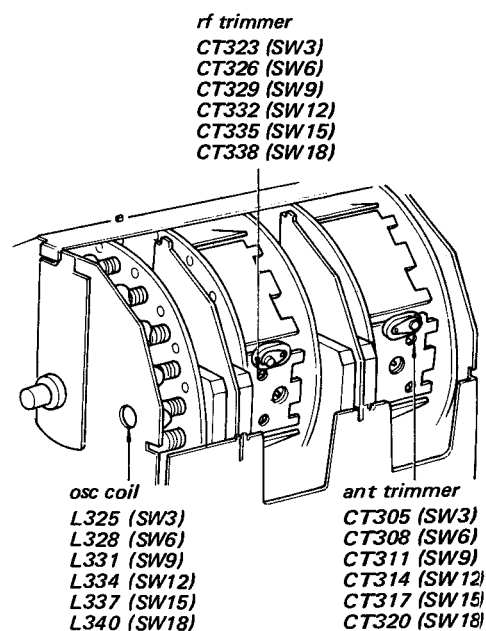


Fig. 3-17 Adjusting parts location for SW3, SW6, SW9, SW12, SW15 and SW18

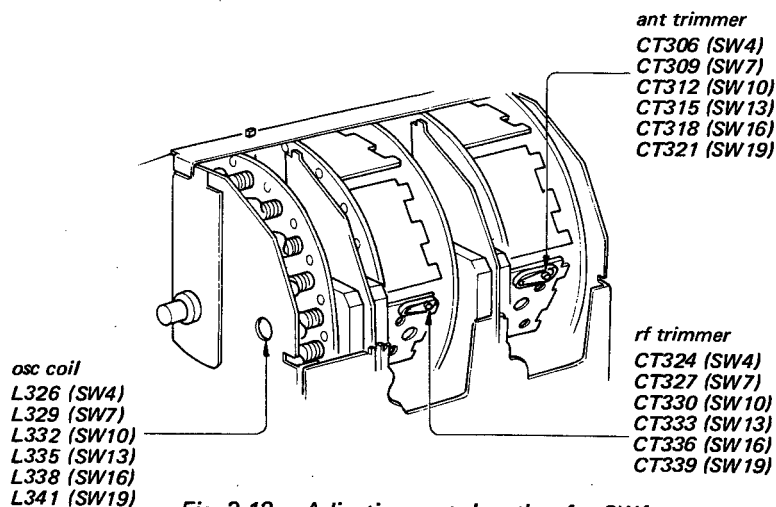


Fig. 3-18 Adjusting parts location for SW4, SW7, SW10, SW13, SW16 and SW19

3-10. VOLTAGE AND CURRENT ADJUSTMENT

A. Emitter Voltage of Q201

1. Band Selector: FM
2. R202 is to be selected to obtain 1.0 ± 0.1 V at the emitter of Q201.

R202	1-244-706	24 k Ω
	1-244-707	27 k Ω
	1-244-708	30 k Ω
	1-244-709	33 k Ω

B. Collector Current of Q401

1. Band Selector: MW
2. Select the resistance value of R402 to obtain 0.27 ± 0.02 V at the emitter of Q401. Then collector current may be adjusted at 270 μ A.

R401	1-242-717	68 k Ω
	1-242-718	75 k Ω
	1-242-719	82 k Ω

C. Collector Current of Q501

1. Band Selector: MW
2. Select the resistance value of R503 to obtain 0.32 ± 0.03 V at the emitter of Q501. Then collector current may be adjusted at 600 μ A.

R503	1-240-514	51 k Ω
	1-240-515	56 k Ω
	1-240-516	62 k Ω
	1-240-517	68 k Ω

D. Collector Current of Q502

1. Band Selector: MW
2. Select the resistance value of R507 to obtain 0.40 ± 0.04 V at the emitter of Q502. Then collector current may be adjusted at 800 μ A.

R507	1-240-514	51 k Ω
	1-240-515	56 k Ω
	1-240-516	62 k Ω
	1-240-517	68 k Ω

E. Regulator Voltage Adjustment

- Select the resistance value of R703 to obtain 4.5 ± 0.1 V at the emitter of Q701.

R703	1-244-652	130 Ω
	1-244-653	150 Ω
	1-244-654	160 Ω
	1-244-655	180 Ω
	1-244-656	200 Ω
	1-244-657	220 Ω

F. Tuning Meter Calibration

1. Band Selector: FM2
2. Supply a 98 MHz signal of 310 μ V (50 dB) to the FM EXT ANT (75 ohms) terminal.
3. Adjust the adjustable resistor VR201 (5 k Ω) so that the meter indicates between 8 and 9. (See Fig. 3-20).

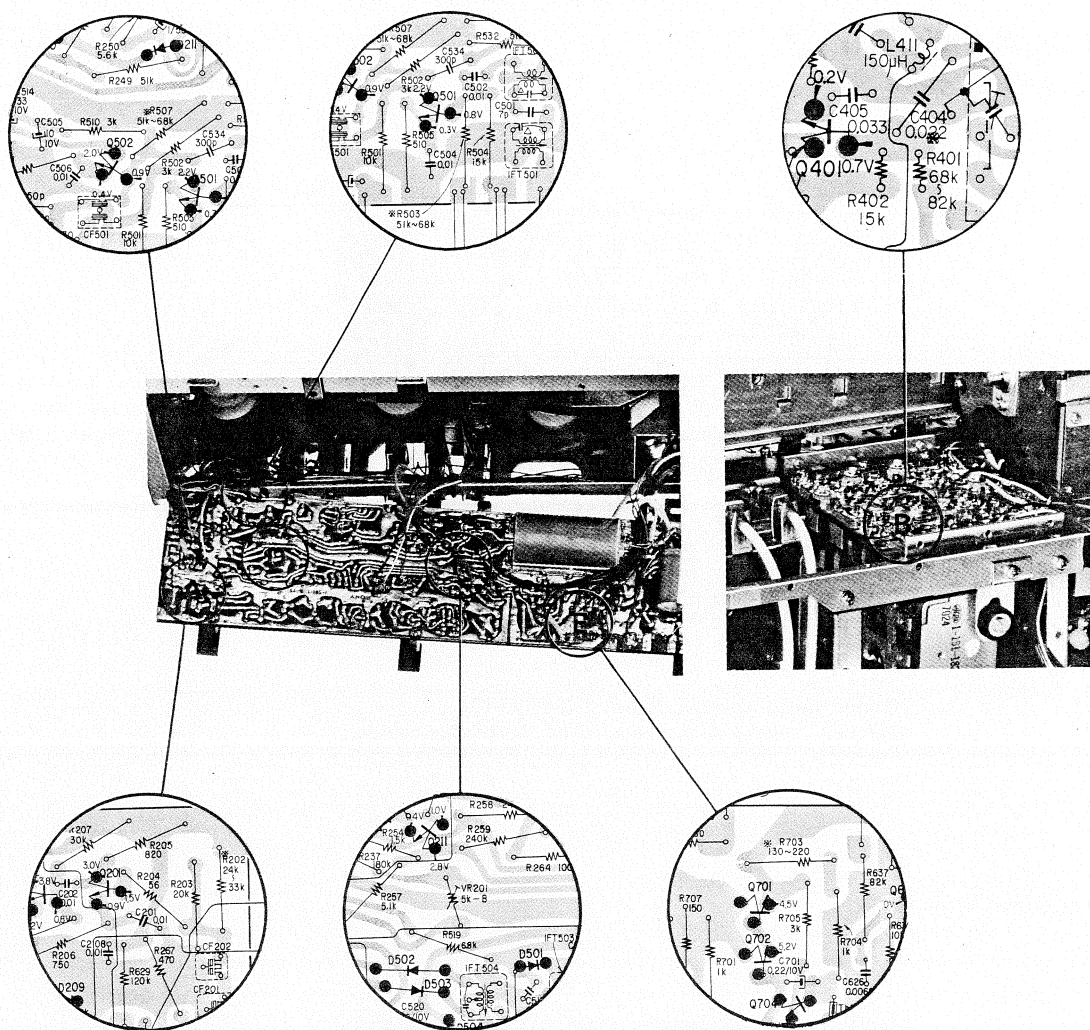


Fig. 3-19 Adjusting parts location for voltage and current adjustment

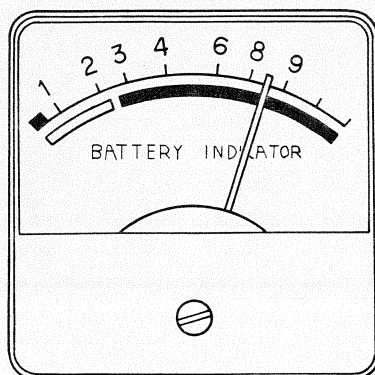
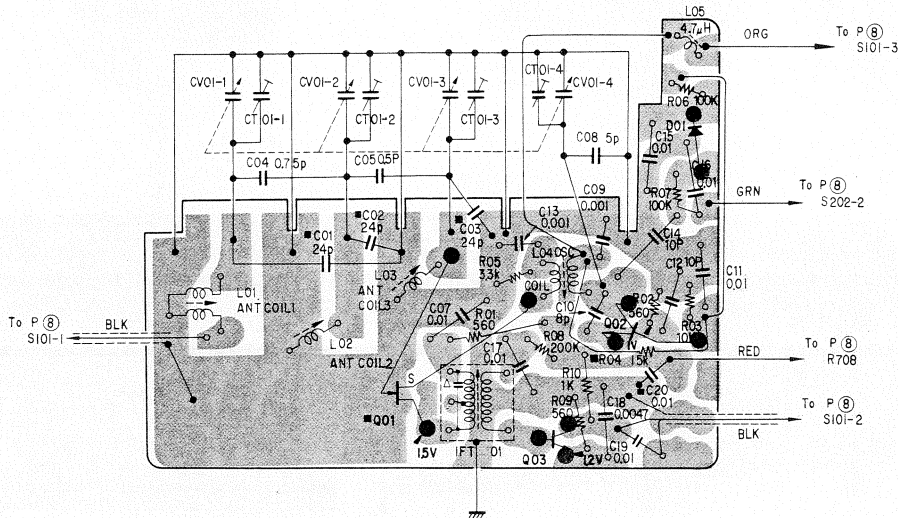


Fig. 3-20 Tuning meter calibration

SECTION 4 **MOUNTING AND SCHEMATIC DIAGRAMS**

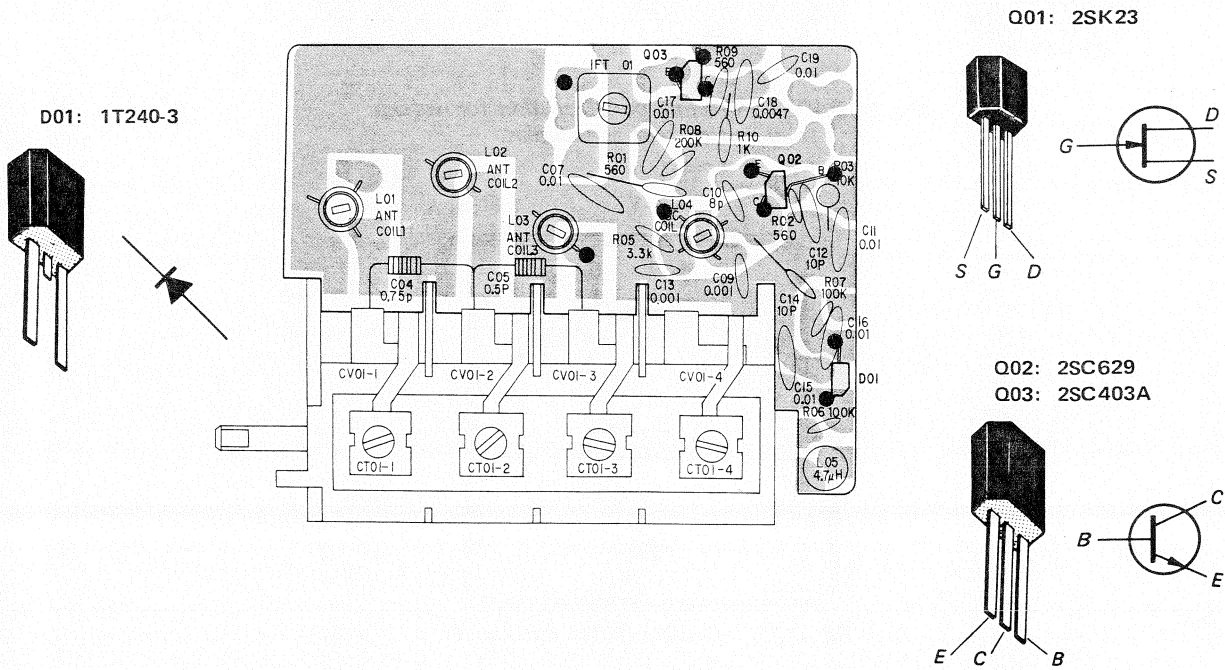
4-1. FM1 FRONT END (P1)

— Conductor Side —



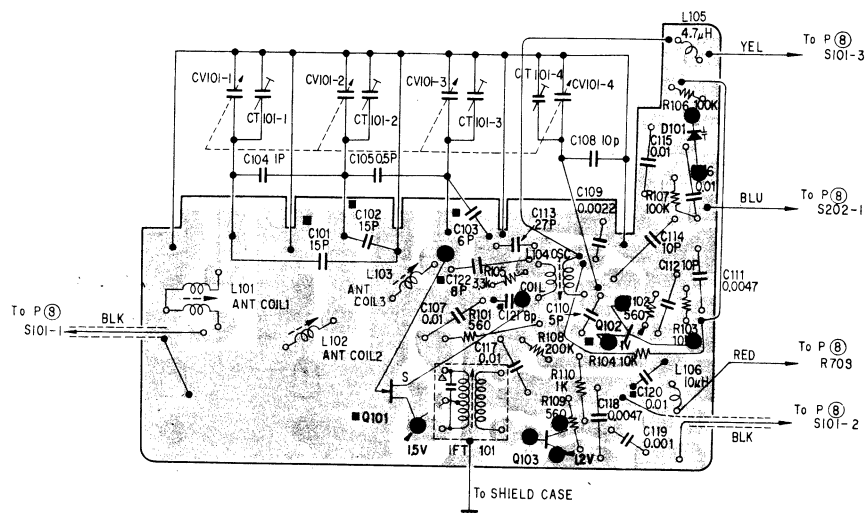
Printed circuit board, Part No. 1-538-793-12
The parts marked ■ are mounted on the conductor side.

— Component Side —



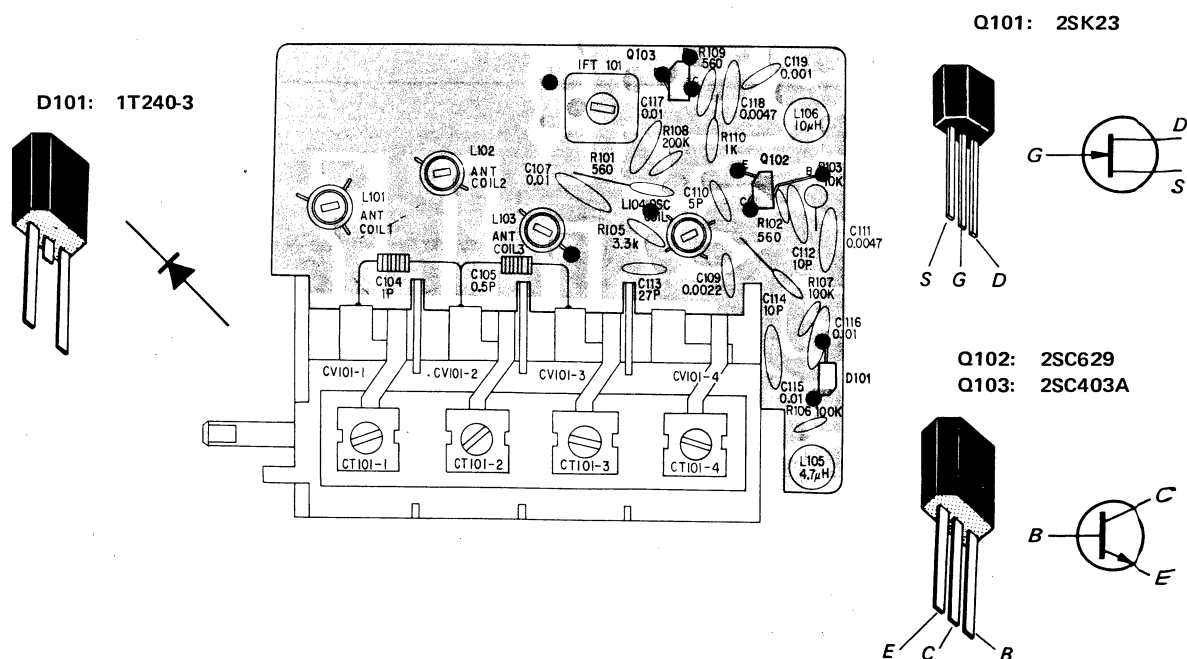
4-2. FM2 FRONT END (P2)

— Conductor Side —



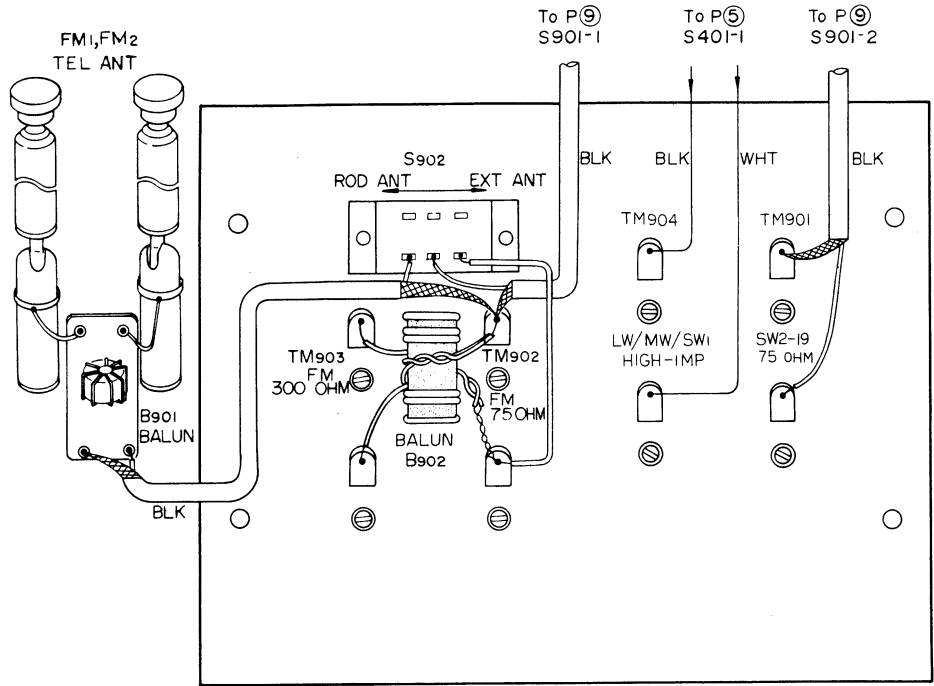
Printed circuit board, Part No. 1-538-793-12
The parts marked ■ are mounted on the conductor side.

— Component Side —

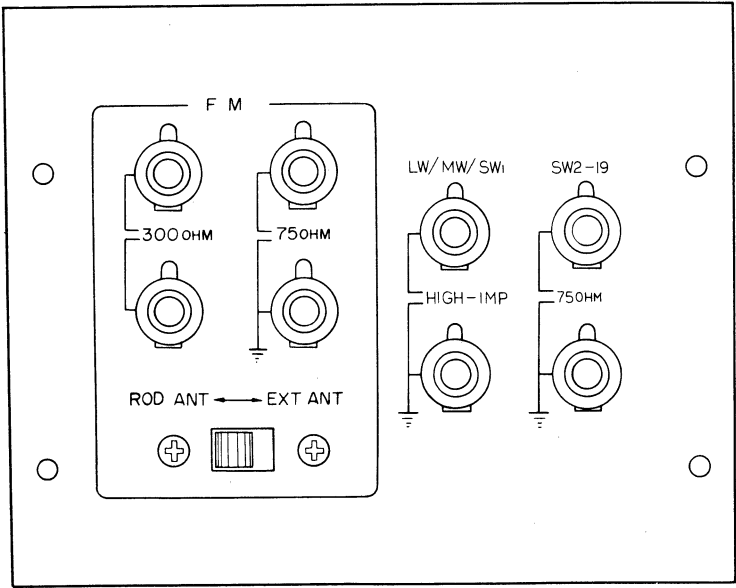


4-3. ANTENNA TERMINAL (P3)

— Conductor Side —

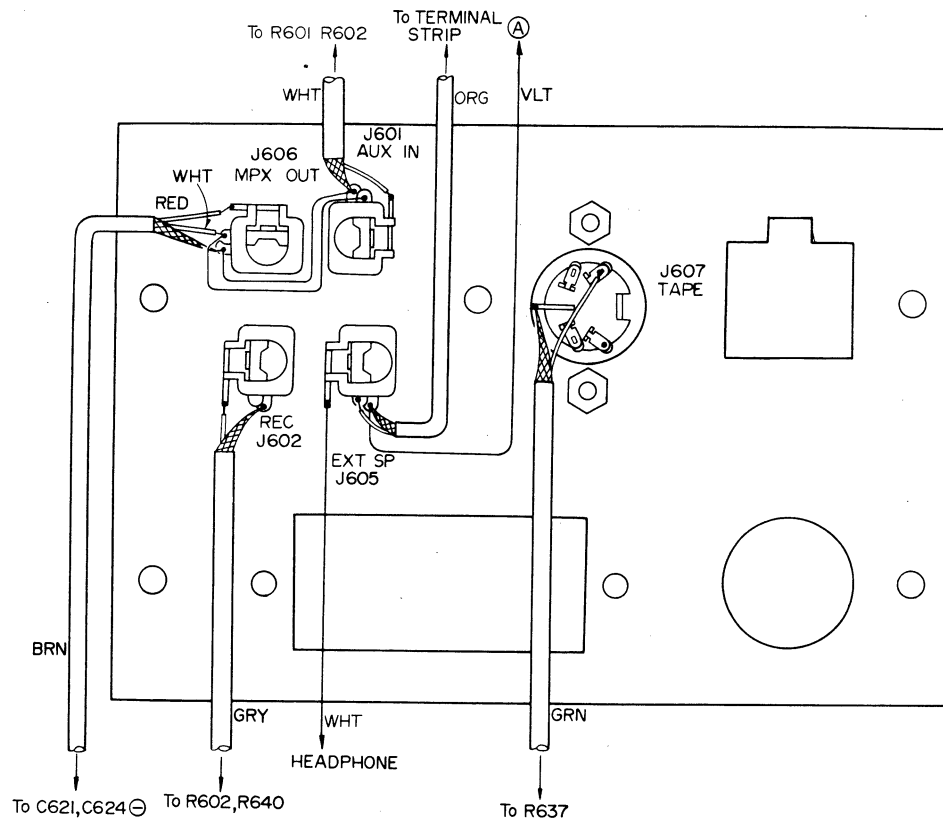


— Component Side —

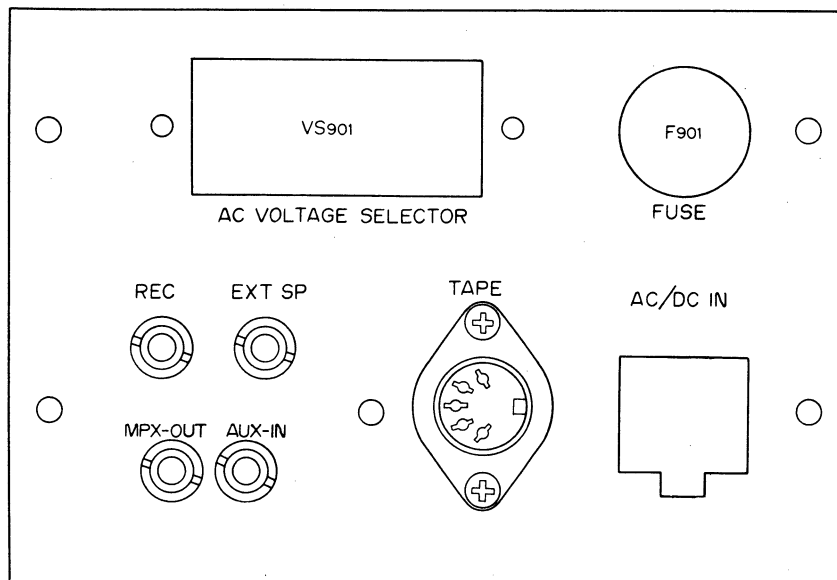


4-4. JACK PANEL (P4)

— Conductor Side —

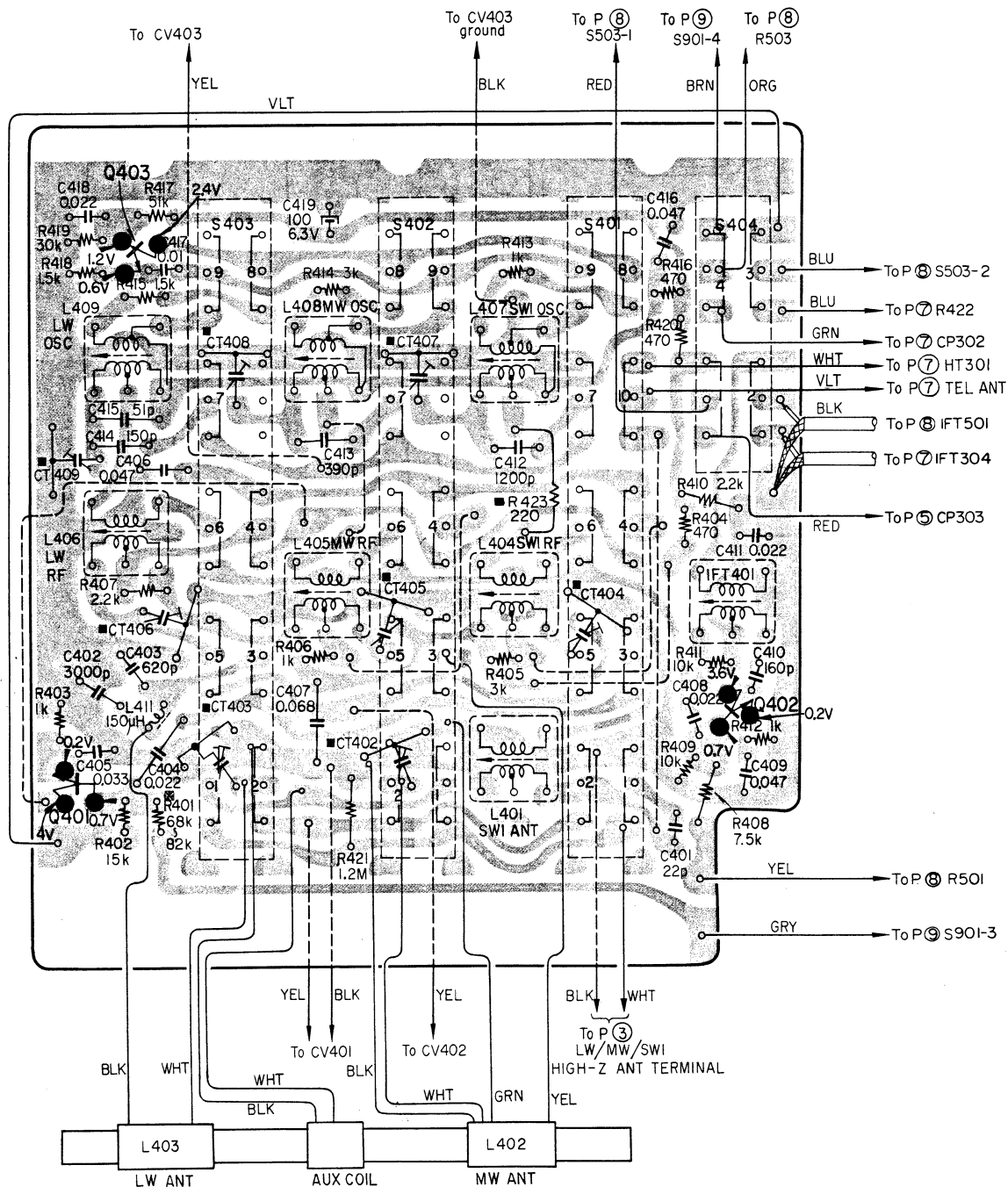


— Component Side —



4-5. CP CIRCUIT BOARD (P5)

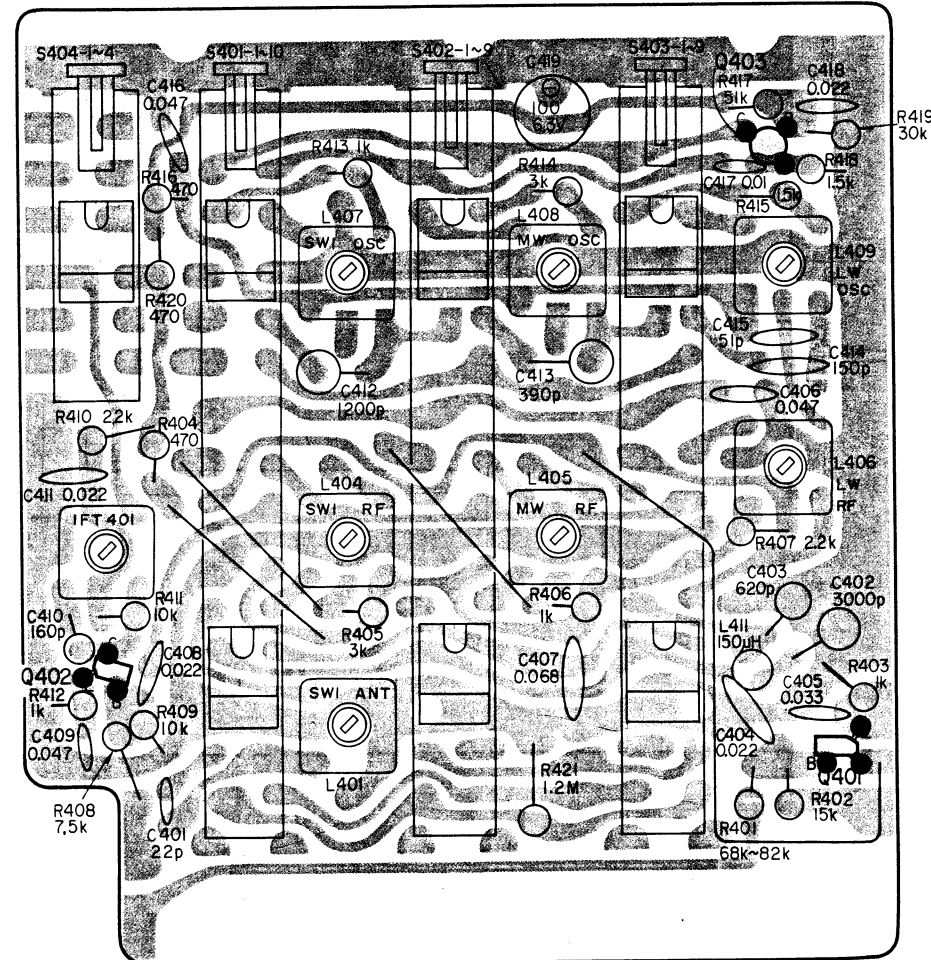
— Conductor Side —



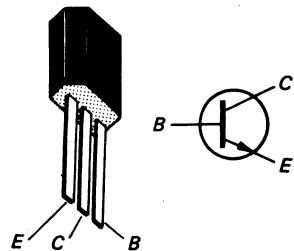
Printed circuit board, Part No. 1-581-165-11

The parts marked ■ are mounted on the conductor side.

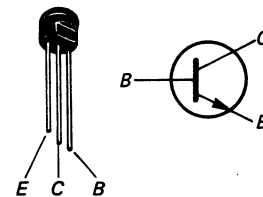
— Component Side —



Q401, Q403: 2SC403B

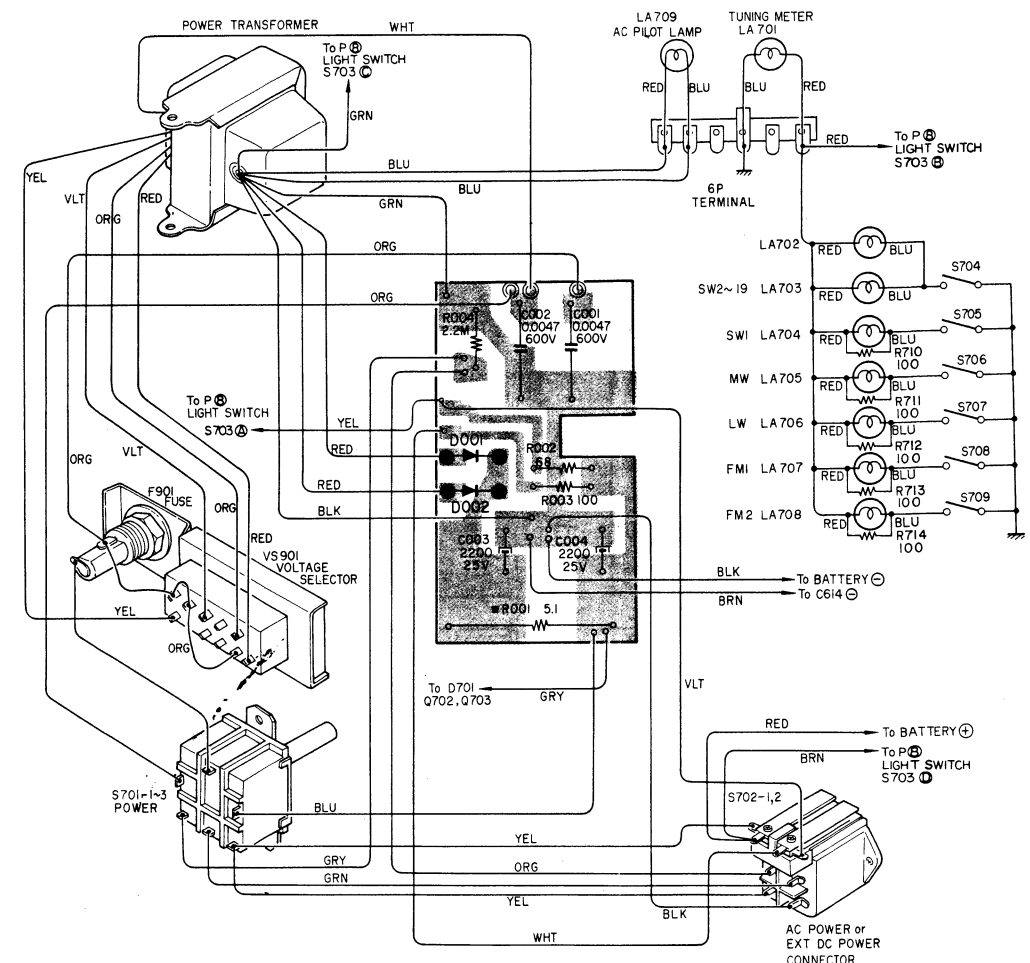


Q402: 2SC668

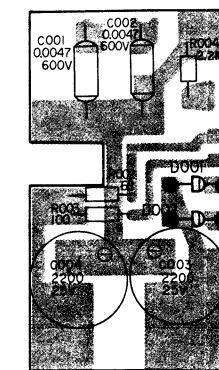


4-6. POWER SUPPLY CIRCUIT BOARD (P6)

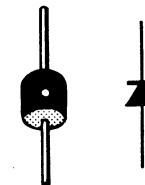
— Conductor Side —



— Component Side —



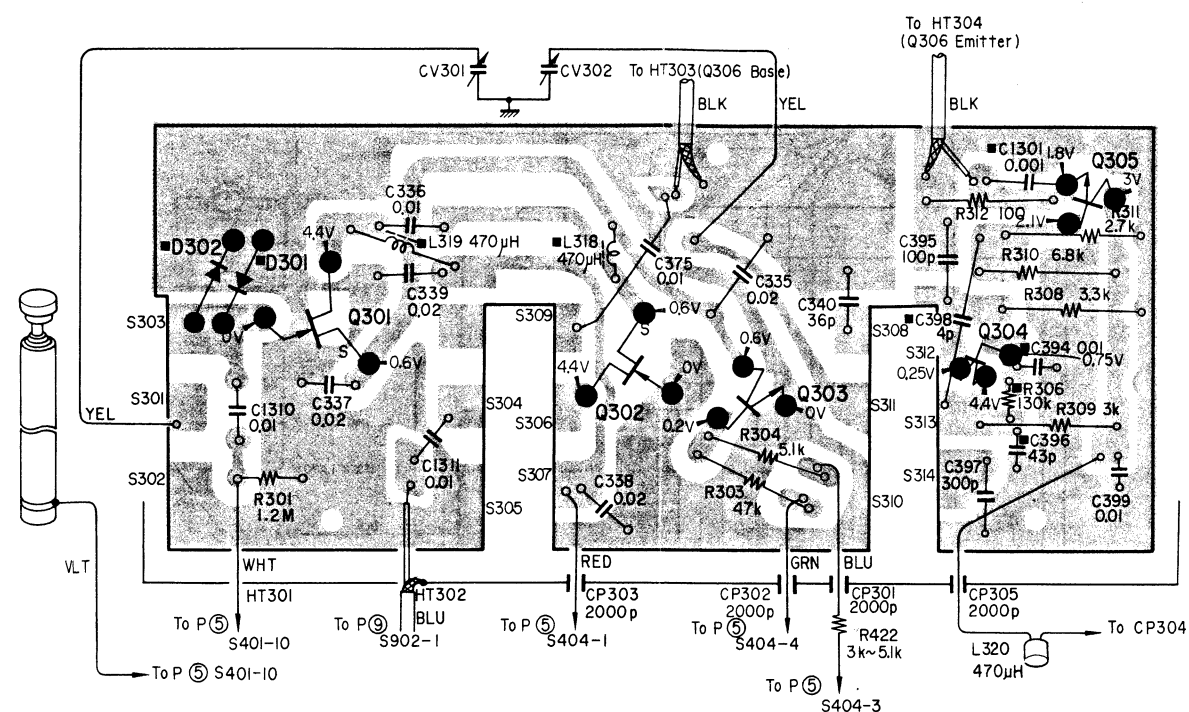
D001, D002: 10D-2



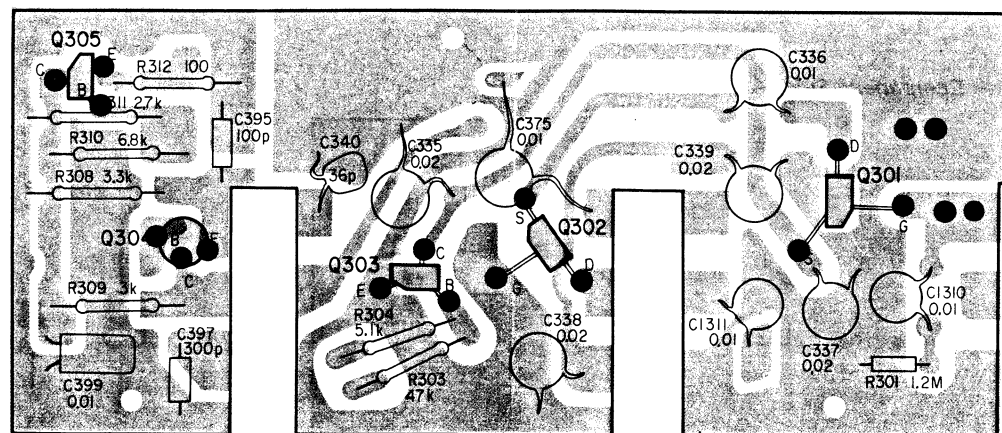
Printed circuit board, Part No. 1-581-167-11
The parts marked ■ is mounted on the conductor side.

4-7. SW2-SW19 FRONT END BLOCK (P7)

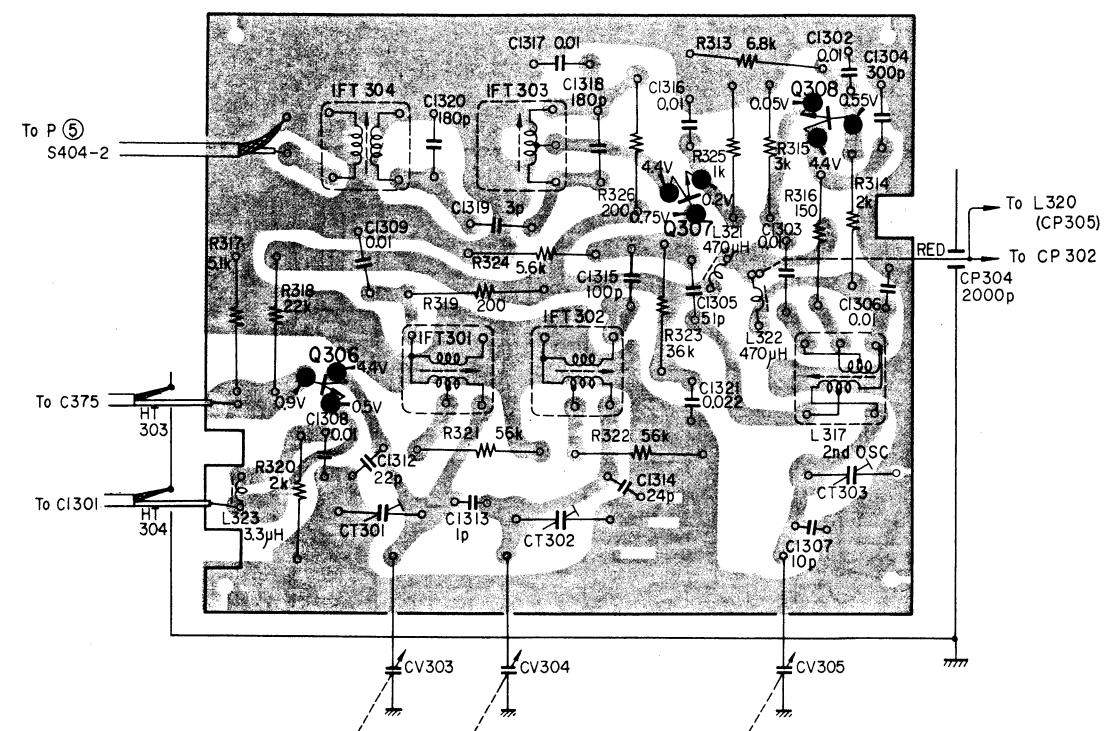
– Conductor Side –



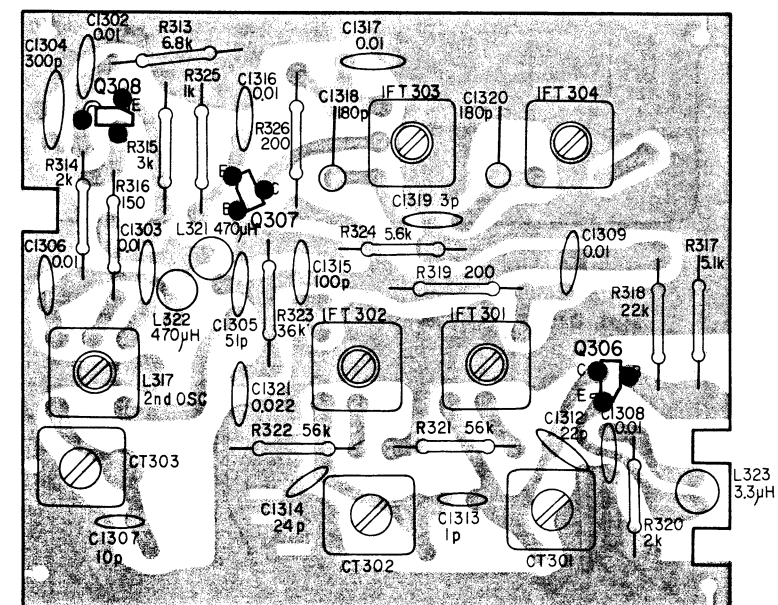
– Component Side –



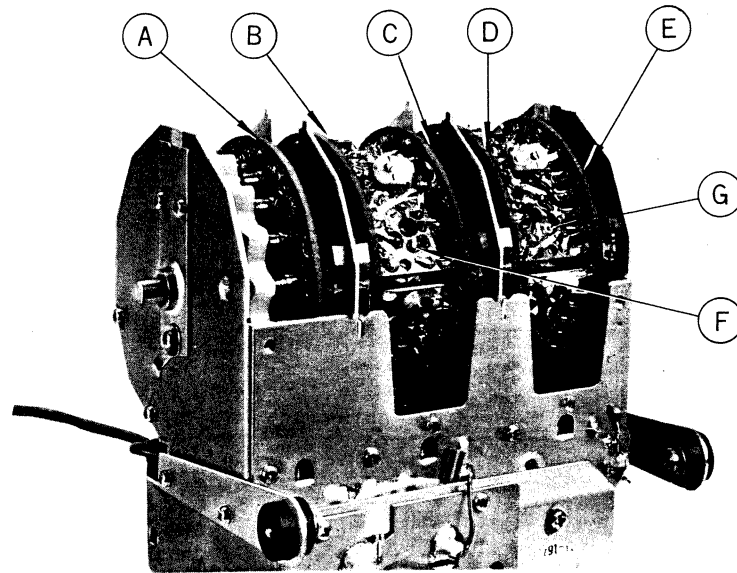
– Conductor Side –



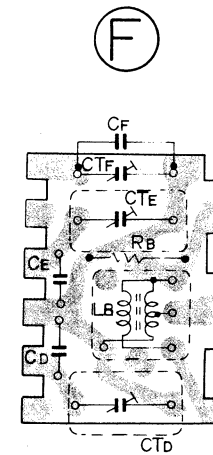
– *Component Side* –



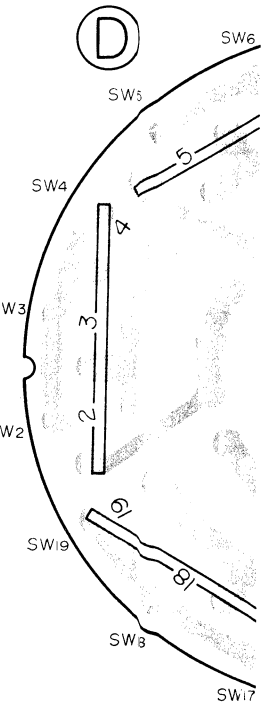
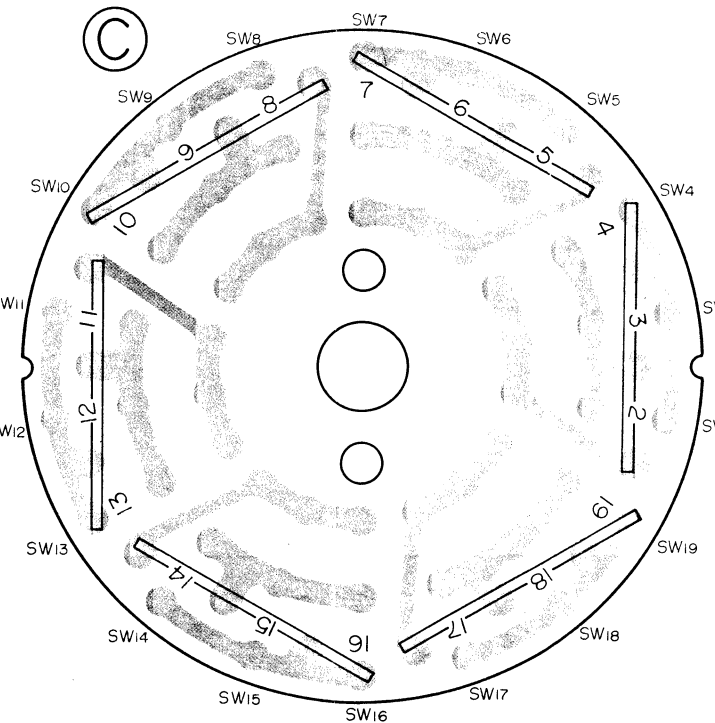
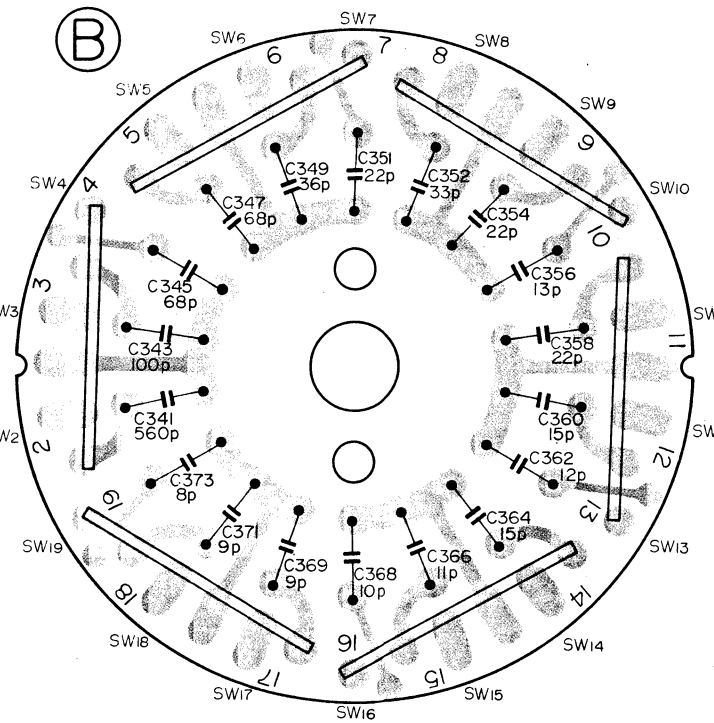
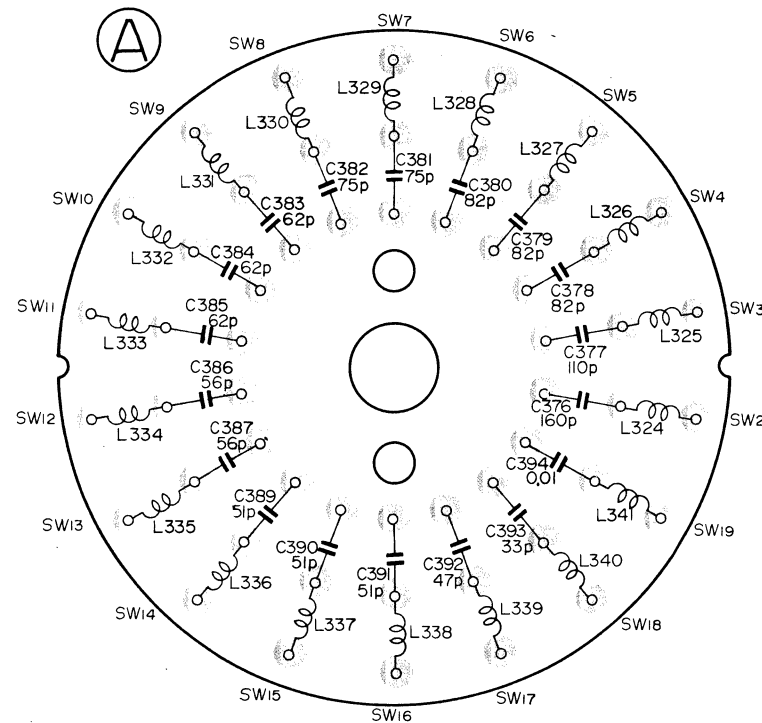
CRF-230B CRF-230B



BAND	SW2~19 RF COIL				TRIMMER CAPACITOR			RB
	LB	CD	CE	CF	CTD	CTE	CTF	
SW2~ SW4	L307	C342 220P	C344 75P	C346 43P	CT322	CT323	CT324	R305 18 k
SW5~ SW7	L308	C348 75P	C350 22P		CT325	CT326	CT327	R328 33 k
SW8~ SW10	L309	C353 68P	C355 24P		CT328	CT329	CT330	
SW11~ SW13	L310	C359 56P	C361 27P		CT331	CT332	CT333	
SW14~ SW16	L311	C365 36P	C367 10P		CT334	CT335	CT336	
SW17~ SW19	L312	C370 10P	C372 7P	C374 7P	CT337	CT338	CT339	

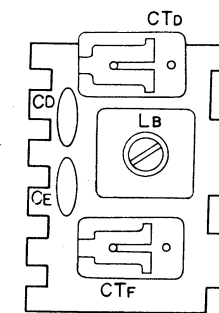


BAND	SW2~19 ANT COIL				TRIMMER CAPACITOR			RA
	LA	CA	CB	CC	CTA	CTB	CTC	
SW2~ SW4	L301	C302 20P	C304 75P	C306 43P	CT304	CT305	CT306	R3 18
SW5~ SW7	L302	C308 75P	C310 22P		CT307	CT308	CT309	R3 33
SW8~ SW10	L303	C313 68P	C315 24P		CT310	CT311	CT312	
SW11~ SW13	L304	C319 56P	C321 27P		CT313	CT314	CT315	
SW14~ SW16	L305	C325 36P	C327 10P		CT316	CT317	CT318	
SW17~ SW19	L306	C330 10P	C332 7P	C334 7P	CT319	CT320	CT321	

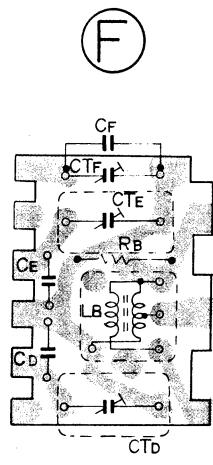


SW2 ~ 19: 1st OSC Coil.
All coils and capacitors: Mounted on the Conductor Side.

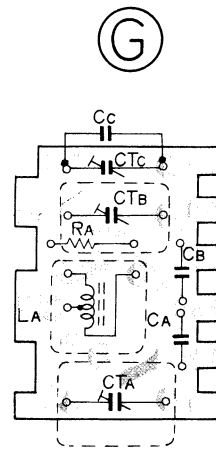
All capacitors: Mounted on the Conductor Side.



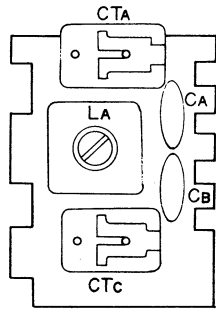
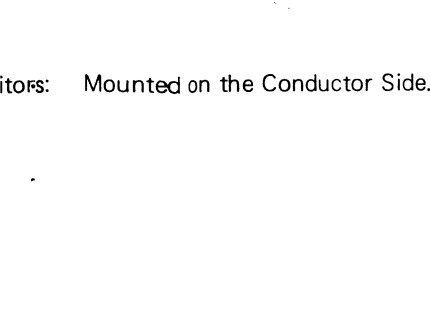
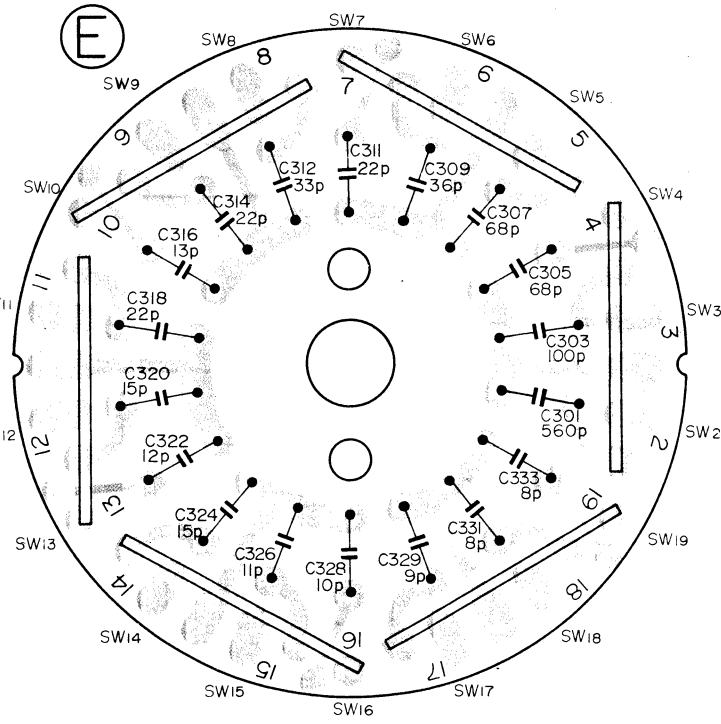
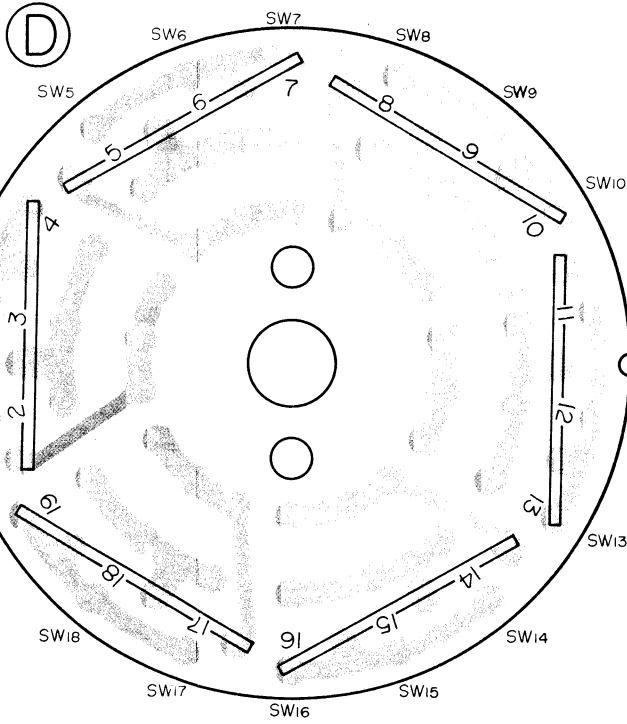
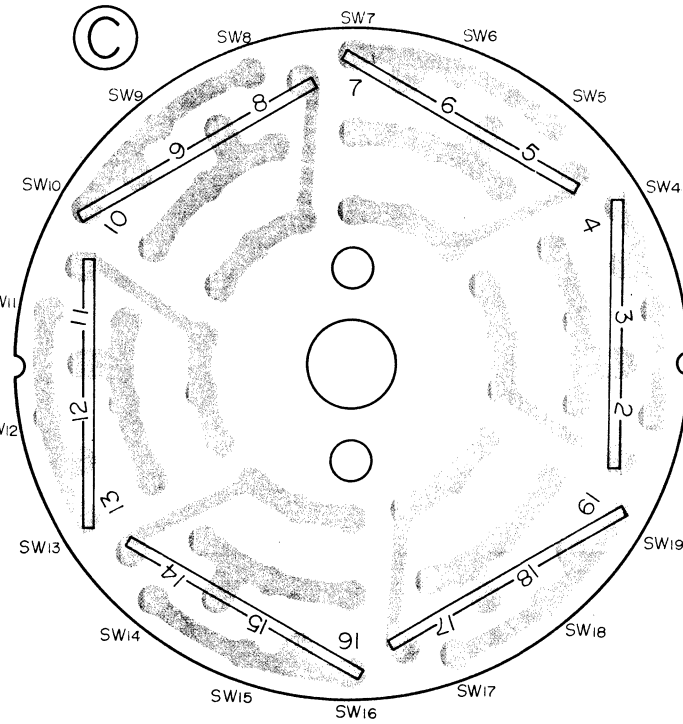
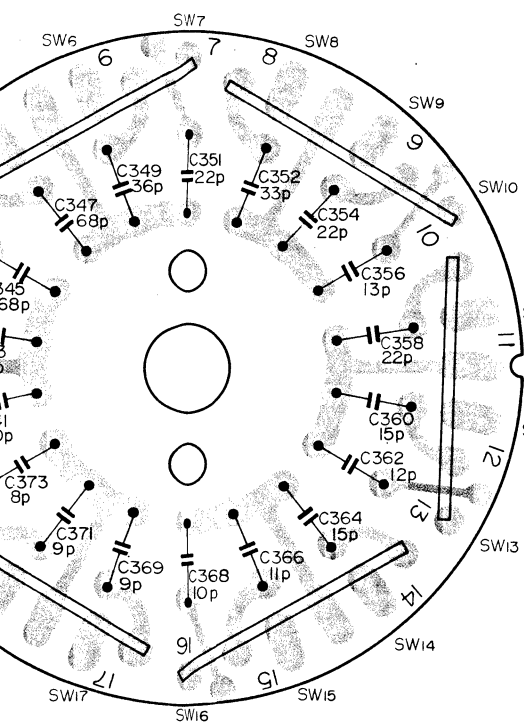
TRIMMER CAPACITOR					RB
E	CF	CTD	CTE	CTF	
44	C346	CT322	CT323	CT324	R305
50	43P				18 k
55		CT325	CT326	CT327	R328
61					33 k
67		CT328	CT329	CT330	
72	C374	CT331	CT332	CT333	
	7P	CT334	CT335	CT336	
		CT337	CT338	CT339	



BAND	SW2~19 ANT COIL				TRIMMER CAPACITOR			RA
	LA	CA	CB	CC	CTA	CTB	CTC	
SW2~SW4	L301	C302 20P	C304 75P	C306 43P	CT304	CT305	CT306	R302 18 k
SW5~SW7	L302	C308 75P	C310 22P		CT307	CT308	CT309	R327 33 k
SW8~SW10	L303	C313 68P	C315 24P		CT310	CT311	CT312	
SW11~SW13	L304	C319 56P	C321 27P		CT313	CT314	CT315	
SW14~SW16	L305	C325 36P	C327 10P		CT316	CT317	CT318	
SW17~SW19	L306	C330 10P	C332 7P	C334 7P	CT319	CT320	CT321	

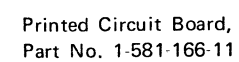
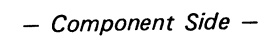


CC, CTC, RA: Mounted on the Conductor Side.

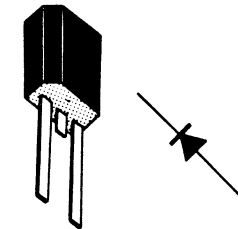


All capacitors: Mounted on the Conductor Side.

– Conductor Side –



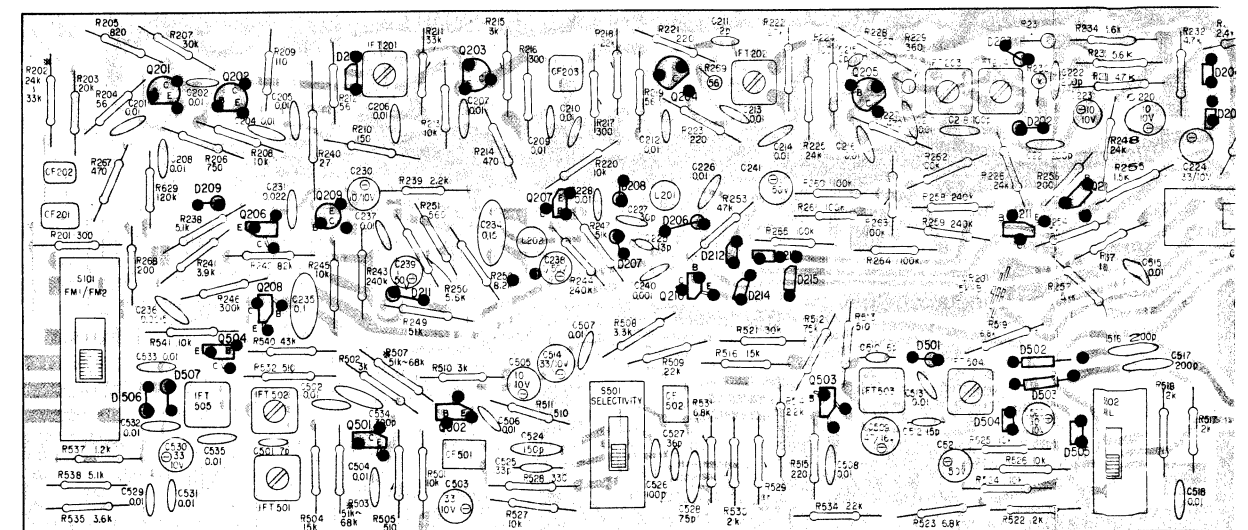
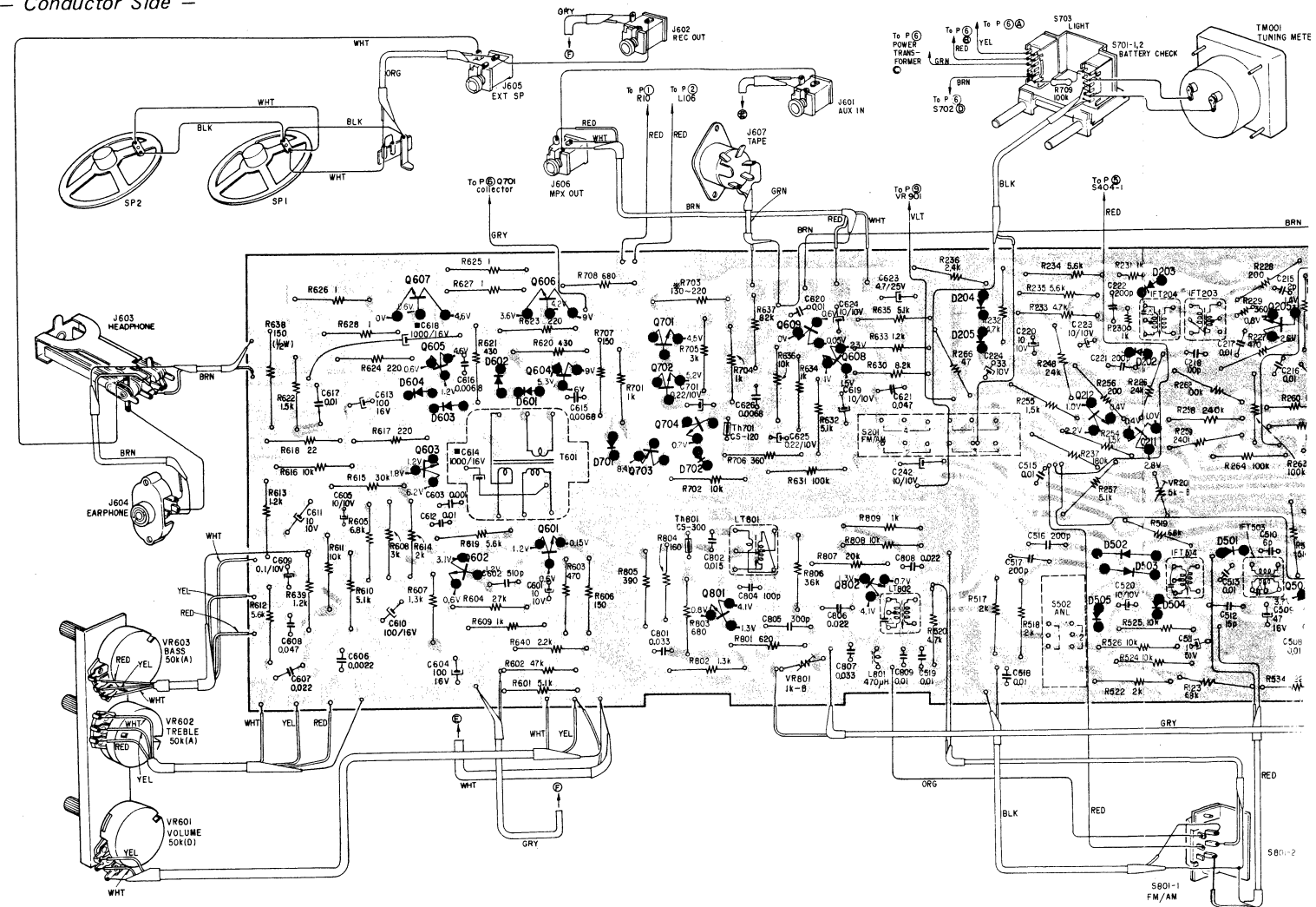
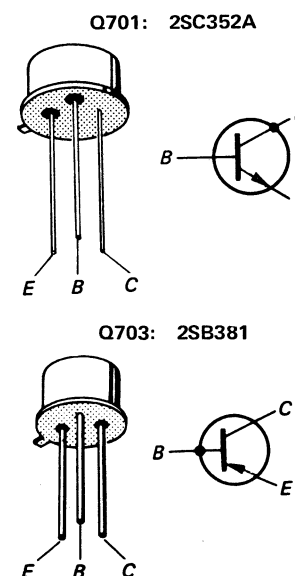
— Conductor Side —



The image shows two standard electronic symbols. On the left is a resistor, represented by a rectangle with a diagonal line through it. On the right is a diode, represented by a triangle pointing to a vertical line.

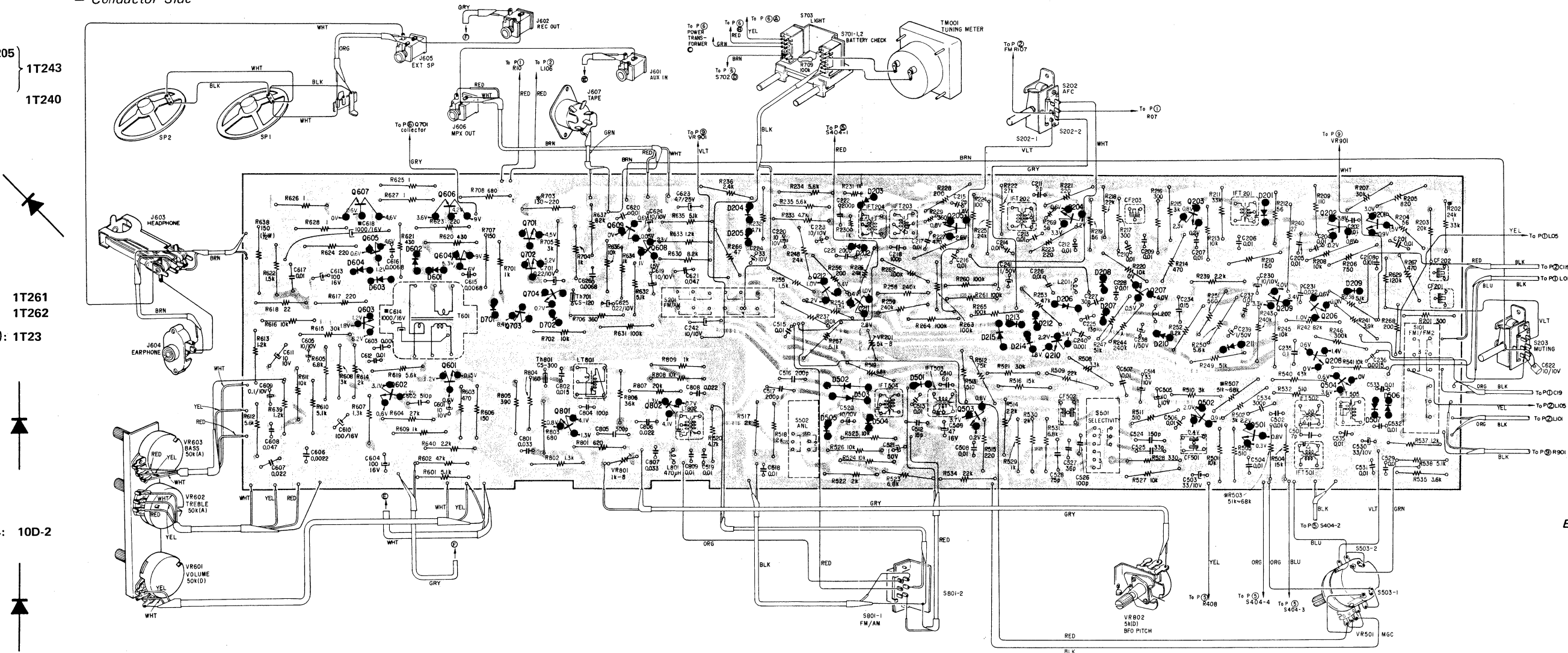
The image shows two standard electronic symbols. On the left is a diode symbol, consisting of a vertical line with a horizontal bar across its center, forming a triangle pointing to the right. On the right is a Zener diode symbol, which is similar to the diode symbol but with a horizontal bar across the center that has a small gap in the middle, forming a shape like a 'Z'.

— *Component Side* —

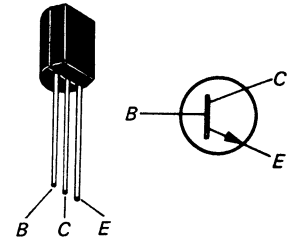


4-9. MAIN CIRCUIT BOARD (P8)

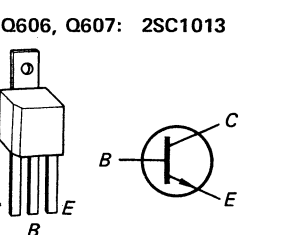
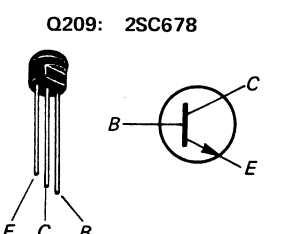
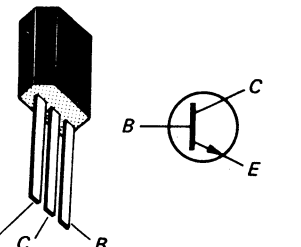
— Conductor Side —



Q201 ~ Q205: 2SC710
Q801: 2SC870

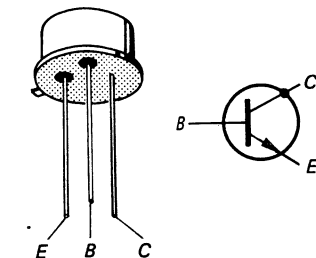


Q206 ~ Q208
Q210
Q601 ~ Q605
Q608, Q609
Q702, Q704
Q211, Q212
Q501 ~ Q504
Q802

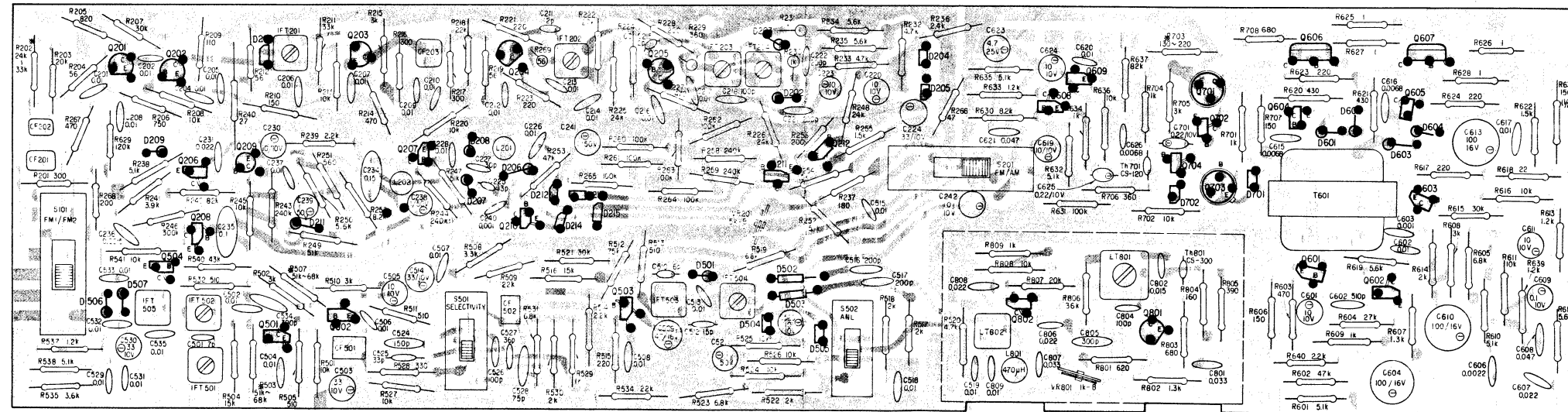
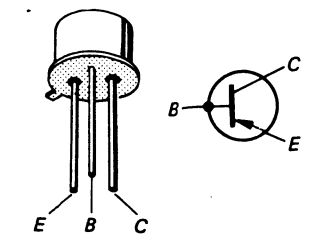


— Component Side —

Q701: 2SC352A

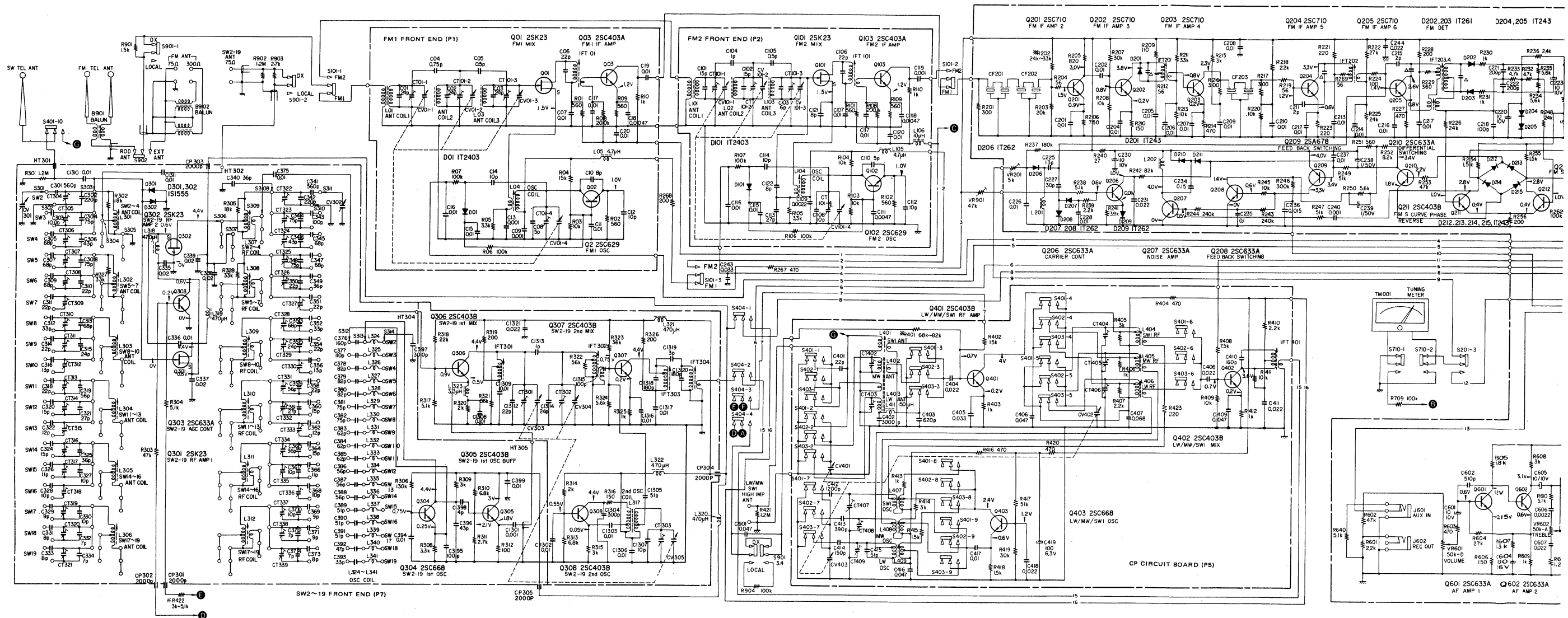


Q703: 2SB381



Printed circuit board, Part No.
1-581-168-11
The parts marked ■ are mounted on
the conductor side.

4-10. SCHEMATIC DIAGRAM



Note:

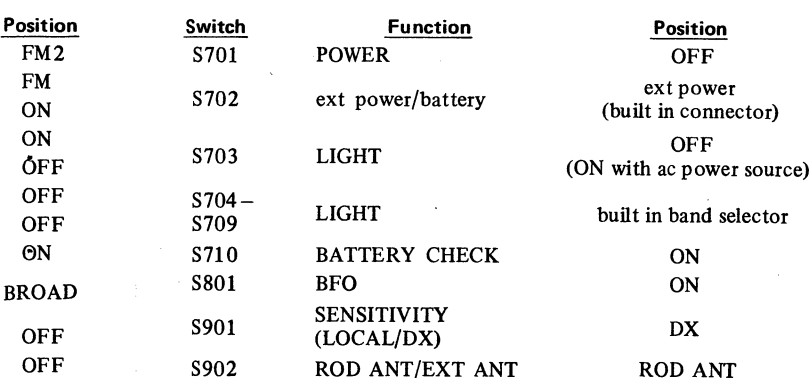
1. --- shows grounding to chassis.
2. All resistors and capacitors are in Ω and μF , unless otherwise indicated.
3. Capacitor marked Δ is built in IFT transformer.
4. The symbol $*$ indicates a component whose value is selected to yield specified operating condition.
5. Voltage value is measured to ground circuit with a dc voltmeter (20 k Ω /V) and current value is measured with a dc ammeter. Voltage and current are taken with no radio signal received. Variations may be noted due to normal production tolerances.

6. Switch Position

Switch	Function
S101	FM 1/FM 2 select
S201	FM/AM select
S202	AFC
S203	MUTING
S401	Band Selector (SW1)
S402	Band Selector (MW)
S403	Band Selector (LW)
S404	Band Selector (SW2-19)
S501	SELECTIVITY (BROAD/SHARP)
S502	ANL
S503	MGC

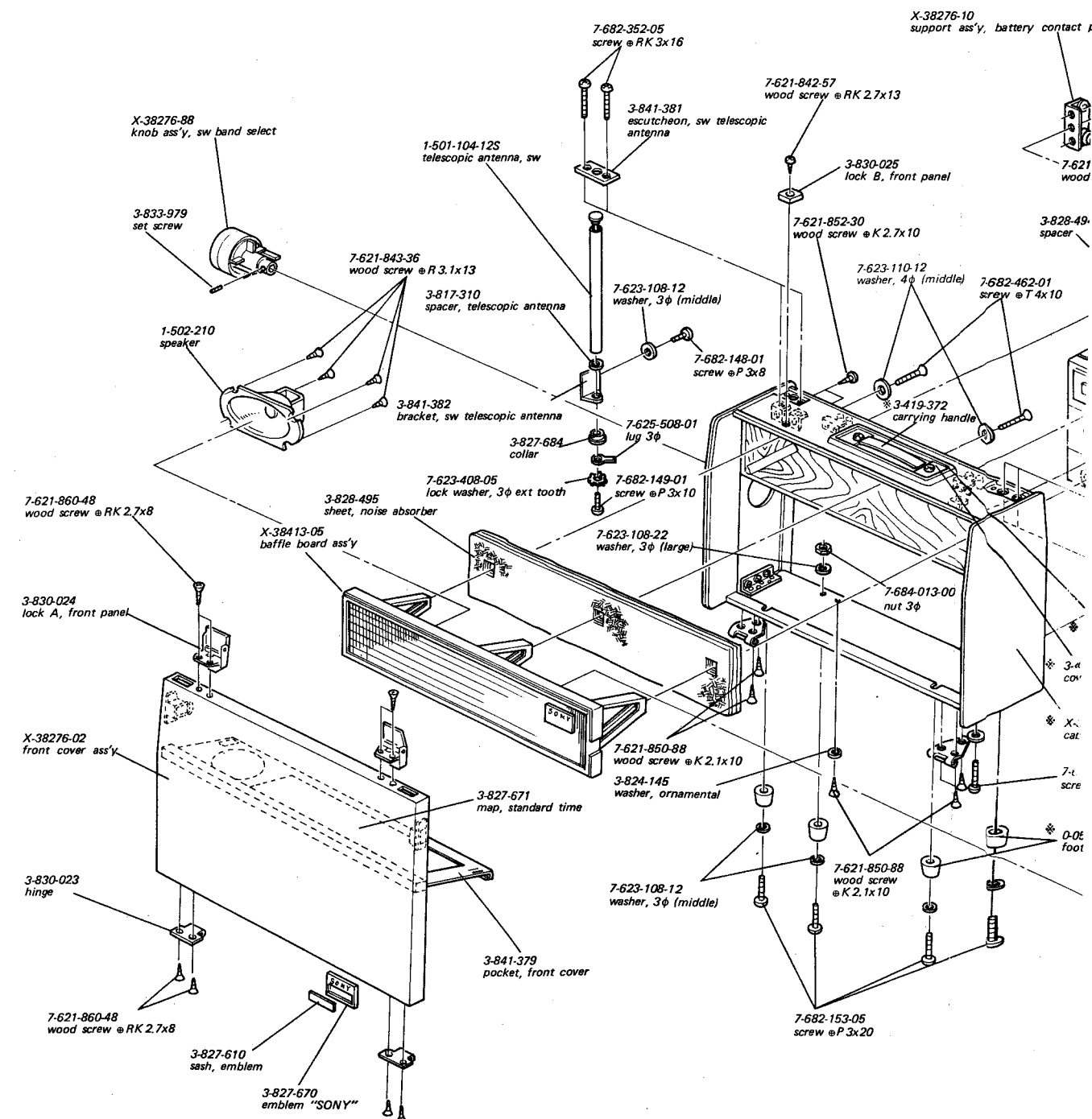
Position	Switch	Function
FM2	S701	POWER
FM	S702	ext power/battery
ON	S703	LIGHT
OFF	S704 -	LIGHT
OFF	S709	LIGHT
ON	S710	BATTERY CHECK
BROAD	S801	BFO
OFF	S901	SENSITIVITY (LOCAL/DX)
OFF	S902	ROD ANT/EXT ANT

Position	Function
OFF	ext power (built in connector)
OFF	(ON with ac power source)
built in band selector	
ON	
ON	
DX	
ROD ANT	

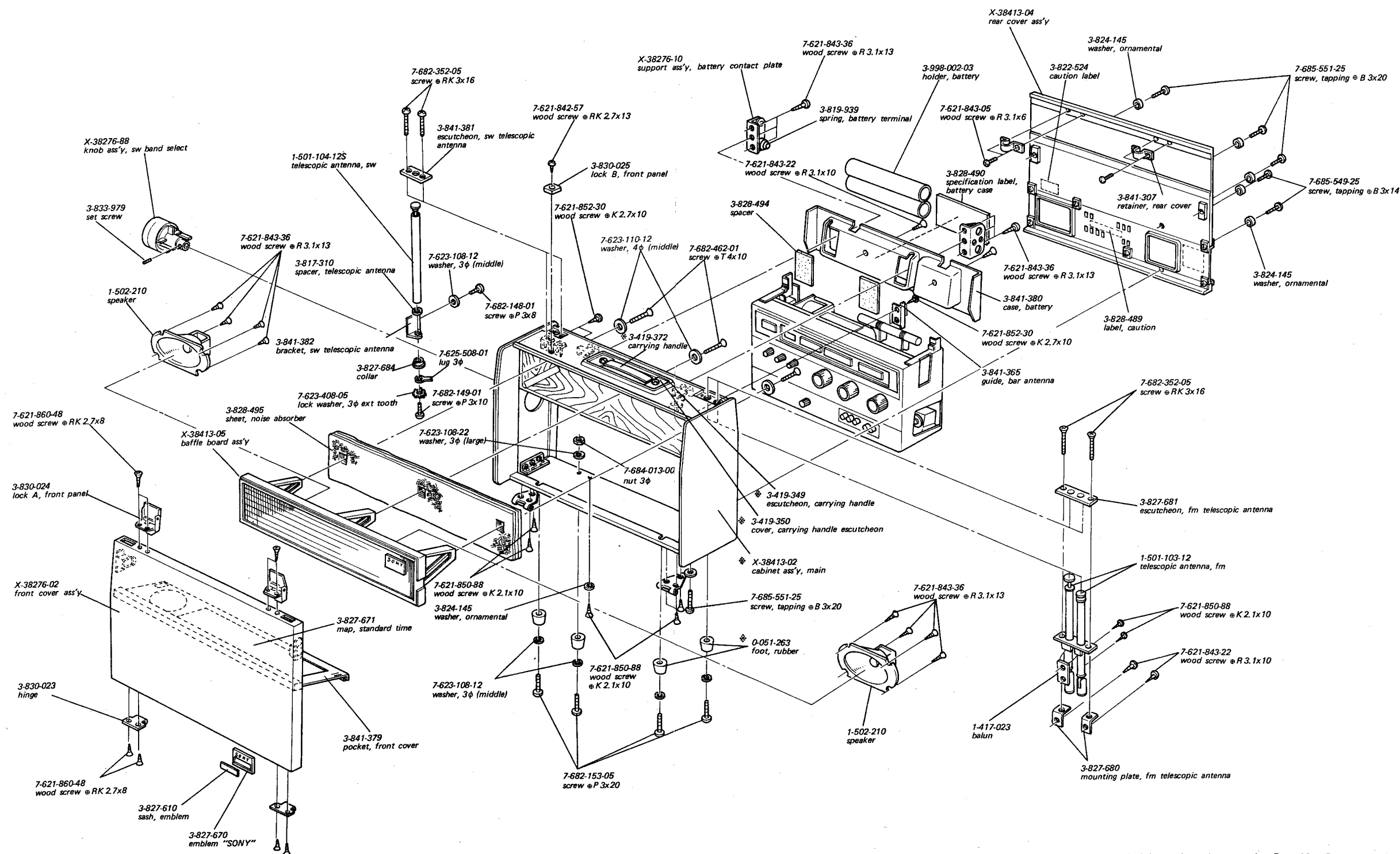


5-2. EXPLODED VIEW (1)

5-2. EXPLODED VIEW (1)

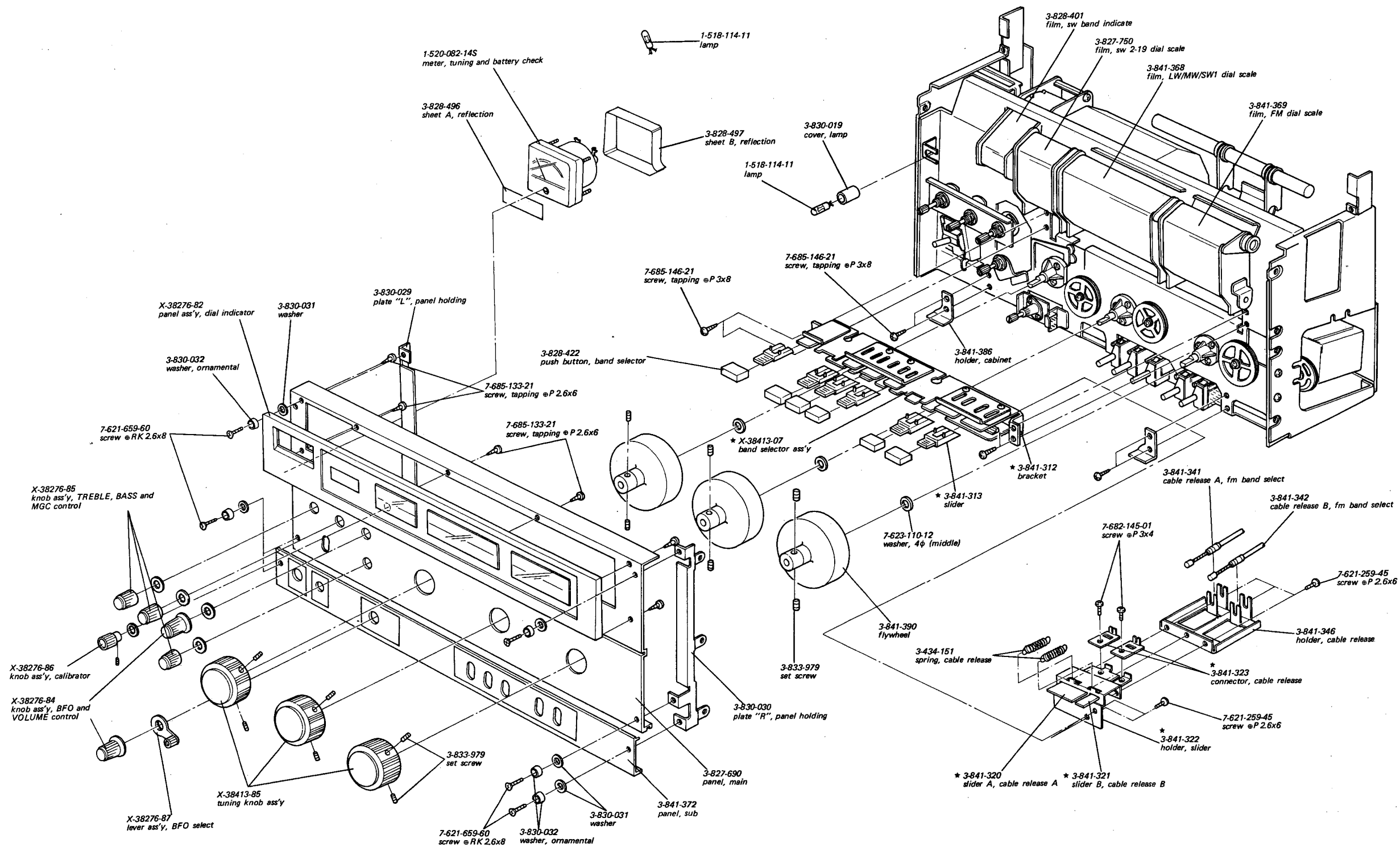


5-2. EXPLODED VIEW (1)



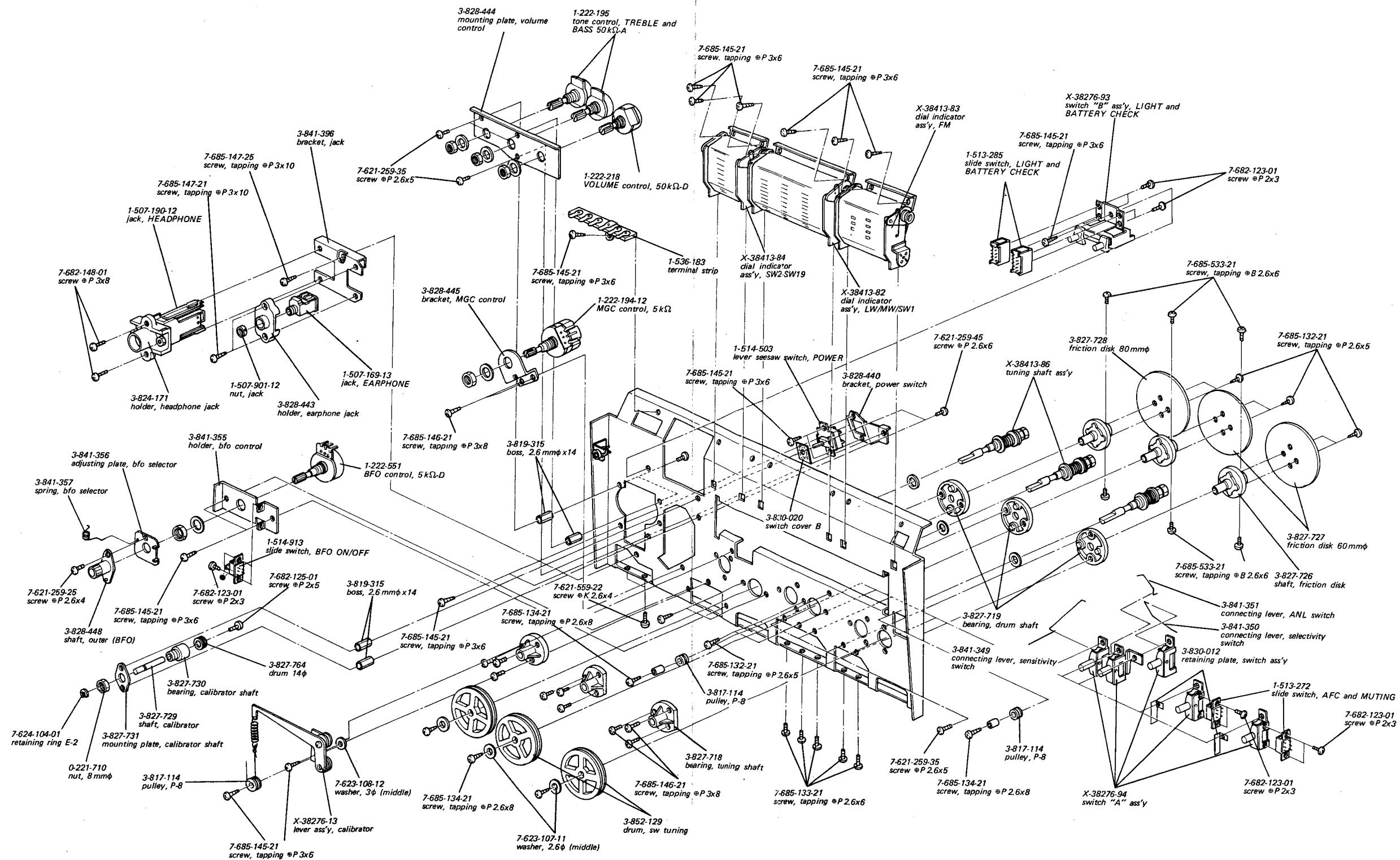
The parts marked * are included in main cabinet ass'y, Part No. X-38413-02.

5-3. EXPLODED VIEW (2)

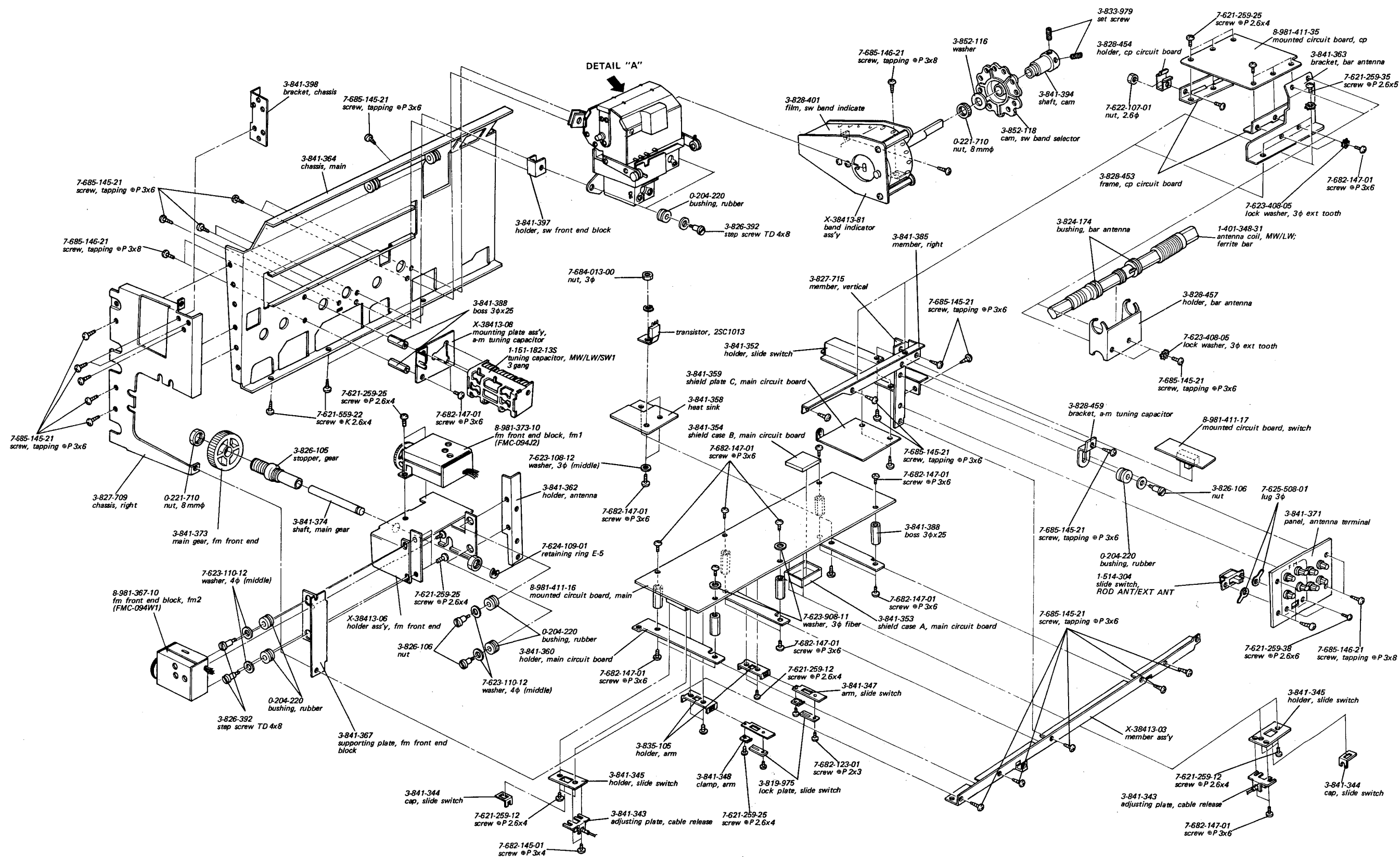


The parts marked ★ are included in band selector ass'y, Part No. X-38413-07.

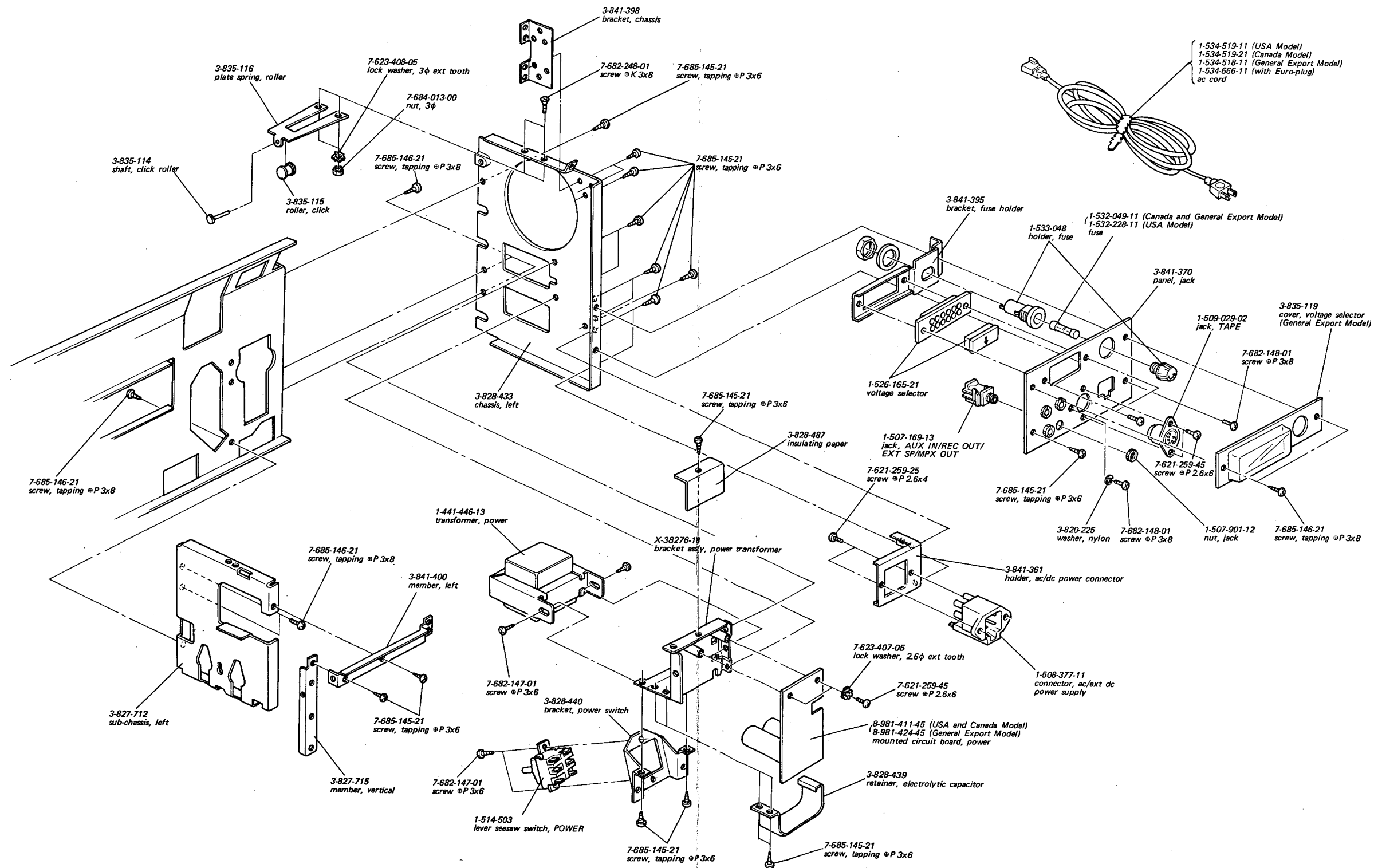
5-4. EXPLODED VIEW (3)



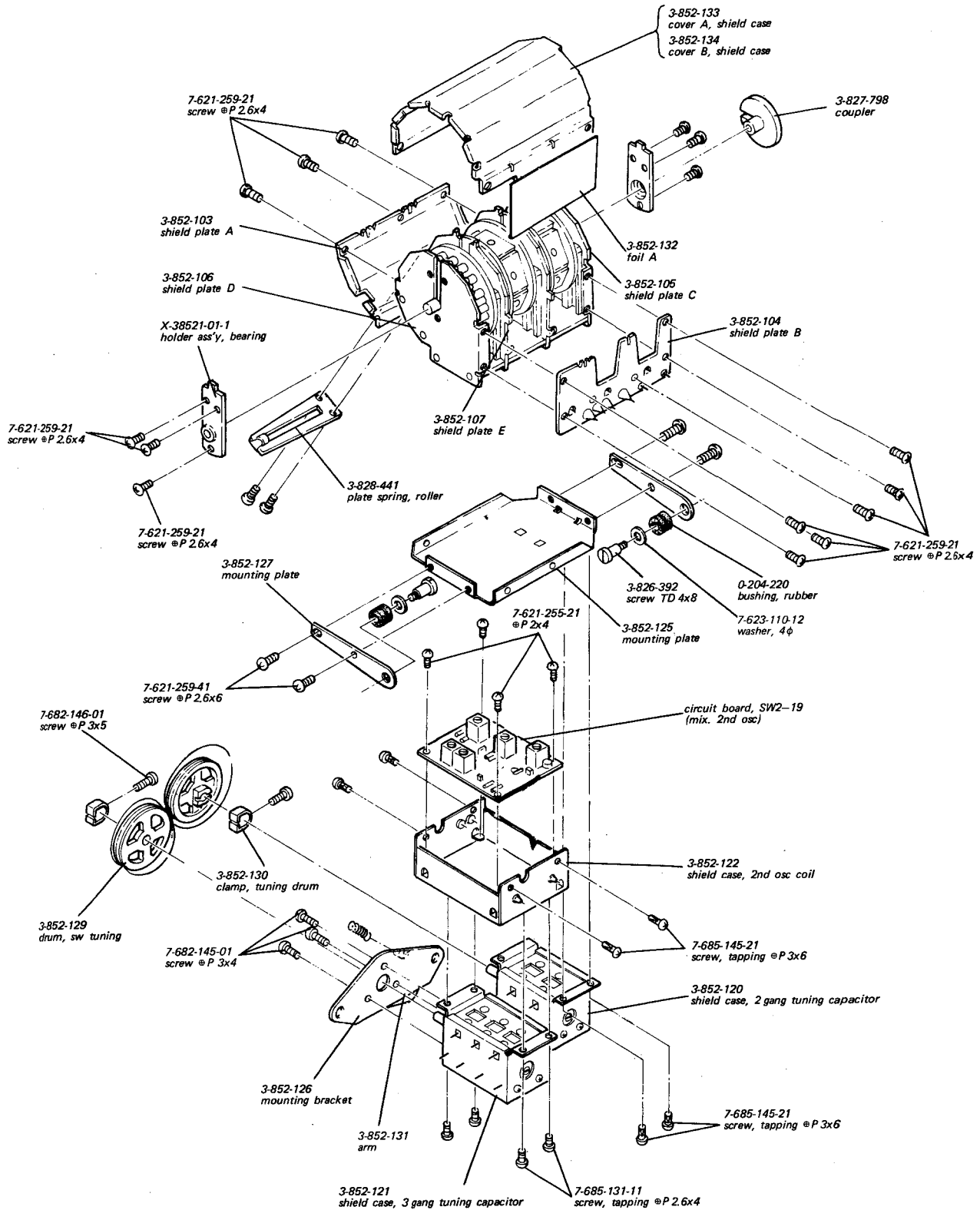
5-5. EXPLODED VIEW (4)



5-6. EXPLODED VIEW (5)



5-7. EXPLODED VIEW (6)



SECTION 6

ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
SEMICONDUCTORS					
Q01		transistor 2SK23	Q704		transistor 2SC633A
Q02		transistor 2SC629	Q801		transistor 2SC870
Q03		transistor 2SC403A	Q802		transistor 2SC403B
Q101		transistor 2SK23	D01		diode 1T240-3
Q102		transistor 2SC629	D101		diode 1T240-3
Q103		transistor 2SC403A	D201		diode 1T243
Q201		transistor 2SC710	D202		diode 1T261
Q202		transistor 2SC710	D203		diode 1T261
Q203		transistor 2SC710	D204		diode 1T243
Q204		transistor 2SC710	D205		diode 1T243
Q205		transistor 2SC710	D206		diode 1T262
Q206		transistor 2SC633A	D207		diode 1T262
Q207		transistor 2SC633A	D208		diode 1T262
Q208		transistor 2SC633A	D209		diode 1T262
Q209		transistor 2SC678	D210		diode 1T262
Q210		transistor 2SC633A	D211		diode 1T262
Q211		transistor 2SC403B	D212		diode 1T243
Q212		transistor 2SC403B	D213		diode 1T243
Q301		transistor 2SK23	D214		diode 1T243
Q302		transistor 2SK23	D215		diode 1T243
Q303		transistor 2SC633A	D301		diode 1S1555
Q304		transistor 2SC668	D302		diode 1S1555
Q305		transistor 2SC403B	D501		diode 1T23
Q306		transistor 2SC403B	D502		diode 1T23
Q307		transistor 2SC403B	D503		diode 1T23
Q308		transistor 2SC403B	D504		diode 1T243
Q401		transistor 2SC403B	D505		diode 1T243
Q402		transistor 2SC668	D506		diode 1T23
Q403		transistor 2SC403B	D507		diode 1T23
Q501		transistor 2SC403B	D601		diode 10D-2
Q502		transistor 2SC403B	D602		diode 10D-2
Q503		transistor 2SC403B	D603		diode 10D-2
Q504		transistor 2SC403B	D604		diode 10D-2
Q601		transistor 2SC633A	D701		diode 1T240
Q602		transistor 2SC633A	D702		diode 1T240
Q603		transistor 2SC633A	Th701		thermistor CS-120
Q604		transistor 2SC633A	Th801		thermistor CS-300
Q605		transistor 2SC633A			
Q606		transistor 2SC1013			
Q607		transistor 2SC1013			
Q608		transistor 2SC633A			
Q609		transistor 2SC633A			
Q701		transistor 2SC352A			
Q702		transistor 2SC633A			
Q703		transistor 2SB381			
			COILS AND TRANSFORMERS		
			L01	1-425-407	ant coil 1, fm 1
			L02	1-425-409	ant coil 2, fm 1
			L03	1-425-409	ant coil 3, fm 1
			L04	1-425-408	osc coil, fm 1
			L05	1-407-186	4.7μH, micro inductor

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
L101	1-425-526	ant coil 1, fm2
L102	1-425-525	ant coil 2, fm2
L103	1-425-525	ant coil 3, fm2
L104	1-405-386	osc coil, fm2
L105	1-407-186	4.7 μ H, fm2
L106	1-407-190	10 μ H, fm2
L201	1-407-177	470 μ H, micro inductor
L202	1-407-177	470 μ H, micro inductor
L301	1-401-463	ant coil, sw2 ~ sw4
L302	1-401-341	ant coil, sw5 ~ sw7
L303	1-401-342	ant coil, sw8 ~ sw10
L304	1-401-343	ant coil, sw11 ~ sw13
L305	1-401-345	ant coil, sw14 ~ sw16
L306	1-401-345	ant coil, sw17 ~ sw19
L307	1-425-680	rf coil, sw2 ~ sw4
L308	1-425-429	rf coil, sw5 ~ sw7
L309	1-425-430	rf coil, sw8 ~ sw10
L310	1-425-431	rf coil, sw11 ~ sw13
L311	1-425-433	rf coil, sw14 ~ sw16
L312	1-425-433	rf coil, sw17 ~ sw19
L317	1-405-352	osc coil, sw 2nd
L318	1-407-177	470 μ H, micro inductor
L319	1-407-177	470 μ H, micro inductor
L320	1-407-177	470 μ H, micro inductor
L321	1-407-177	470 μ H, micro inductor
L322	1-407-177	470 μ H, micro inductor
L323	1-407-184	3.3 μ H, micro inductor
L324	1-405-334	osc coil, sw2
L325	1-405-335	osc coil, sw3
L326	1-405-336	osc coil, sw4
L327	1-405-337	osc coil, sw5
L328	1-405-338	osc coil, sw6
L329	1-405-339	osc coil, sw7
L330	1-405-340	osc coil, sw8
L331	1-405-341	osc coil, sw9
L332	1-405-342	osc coil, sw10
L333	1-405-343	osc coil, sw11
L334	1-405-344	osc coil, sw12
L335	1-405-345	osc coil, sw13
L336	1-405-346	osc coil, sw14
L337	1-405-347	osc coil, sw15
L338	1-405-348	osc coil, sw16
L339	1-405-349	osc coil, sw17
L340	1-405-350	osc coil, sw18
L341	1-405-351	osc coil, sw19
L401	1-401-467	ant coil, sw1
L402	1-401-348-31	ant coil, mw/lw: ferrite bar
L403		
L404	1-425-684	rf coil, sw1
L405	1-425-685	rf coil, mw

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
L406	1-425-444	rf coil, lw
L407	1-405-484	osc coil, sw1
L408	1-405-357	osc coil, mw
L409	1-405-358	osc coil, lw
L410	1-425-445	transformer, a-m i-f
L801	1-407-177	470 μ H, micro inductor
LT801	1-405-450	osc coil, bfo
LT802	1-403-128	output coil, bfo
IFT03	1-403-294	transformer, fm1 i-f
IFT103	1-403-294	transformer, fm2 i-f
IFT201	1-403-244-31	transformer, fm i-f
IFT202	1-403-244-31	transformer, fm i-f
IFT203	1-403-272-31	transformer, fm discriminator
IFT204	1-403-273-31	transformer, fm discriminator
IFT301	1-425-434	transformer, sw 1st i-f
IFT302	1-425-434	transformer, sw 1st i-f
IFT303	1-403-812	transformer, sw 1st i-f
IFT304	1-403-812	transformer, sw 1st i-f
IFT501	1-403-139	transformer, a-m i-f
IFT502	1-403-139	transformer, a-m i-f
IFT503	1-403-128	transformer, a-m i-f
IFT504	1-403-135	transformer, a-m i-f
IFT505	1-403-128	transformer, a-m i-f
CF201	1-527-501	ceramic filter, fm i-f
CF202	1-527-501	ceramic filter, fm i-f
CF203	1-527-501	ceramic filter, fm i-f
CF501	1-403-161-13	ceramic filter, a-m i-f
CF502	1-403-161-13	ceramic filter, a-m i-f
B901	1-417-023	balun
B902	1-417-014	balun
T601	1-423-114	transformer, driver
T701	1-441-446-13	transformer, power

CAPACITORS

CV01	1-151-223-12	tuning capacitor, fm
CT01		
CV101	1-151-223-12	tuning capacitor, fm
CT101		
CV301, 302	1-151-214	tuning capacitor, sw 2 gang
CV303~305	1-151-168	tuning capacitor, sw 3 gang
CV401~403	1-151-182-13S	tuning capacitor, mw/lw, sw1 3 gang

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CT301	1-141-097	capacitor, trimmer (10pF)	C04	1-102-064	0.75 pF ceramic
CT302	1-141-097	capacitor, trimmer (10pF)	C05	1-101-936	0.5 pF ceramic
CT303	1-141-097	capacitor, trimmer (10pF)	C06		
CT304	1-141-078	capacitor, trimmer (16 pF)	C07	1-101-072	0.01 μ F ceramic
CT305	1-141-078	capacitor, trimmer (16 pF)	C08	1-101-955	5 pF ceramic
CT306	1-141-095	capacitor, trimmer (16 pF)	C09	1-105-821-12	0.001 μ F mylar
CT307	1-141-078	capacitor, trimmer (16 pF)	C10	1-102-945	8 pF ceramic
CT308	1-141-078	capacitor, trimmer (16 pF)	C11	1-101-072	0.01 μ F ceramic
CT309	1-141-080	capacitor, trimmer (10pF)	C12	1-101-854	10 pF ceramic
CT310	1-141-078	capacitor, trimmer (16 pF)	C13	1-101-918	0.001 μ F ceramic
CT311	1-141-078	capacitor, trimmer (16 pF)	C14	1-101-959	10 pF ceramic
CT312	1-141-080	capacitor, trimmer (10pF)	C15	1-101-072	0.01 μ F ceramic
CT313	1-141-078	capacitor, trimmer (16 pF)	C16	1-101-072	0.01 μ F ceramic
CT314	1-141-078	capacitor, trimmer (16 pF)	C17	1-101-072	0.01 μ F ceramic
CT315	1-141-080	capacitor, trimmer (10pF)	C18	1-101-140	0.005 μ F ceramic
CT316	1-141-078	capacitor, trimmer (16 pF)	C19	1-101-072	0.01 μ F ceramic
CT317	1-141-079	capacitor, trimmer (10pF)	C20	1-101-072	0.01 μ F ceramic
CT318	1-141-080	capacitor, trimmer (10pF)	C101	1-101-861	15 pF ceramic
CT319	1-141-079	capacitor, trimmer (10pF)	C102	1-101-861	15 pF ceramic
CT320	1-141-079	capacitor, trimmer (10pF)	C103	1-101-956	6 pF ceramic
CT321	1-141-080	capacitor, trimmer (10pF)	C104	1-101-937	1 pF ceramic
CT322	1-141-078	capacitor, trimmer (16 pF)	C105	1-101-936	0.5 pF ceramic
CT323	1-141-078	capacitor, trimmer (16 pF)	C106		— discarded —
CT324	1-141-095	capacitor, trimmer (16 pF)	C107	1-101-072	0.01 μ F ceramic
CT325	1-141-078	capacitor, trimmer (16 pF)	C108	1-102-508	10 pF ceramic
CT326	1-141-078	capacitor, trimmer (16 pF)	C109	1-102-121	0.0022 μ F ceramic
CT327	1-141-080	capacitor, trimmer (10pF)	C110	1-102-864	5 pF ceramic
CT328	1-141-078	capacitor, trimmer (16 pF)	C111	1-102-090	0.0047 μ F ceramic
CT329	1-141-078	capacitor, trimmer (16 pF)	C112	1-102-508	10 pF ceramic
CT330	1-141-080	capacitor, trimmer (10pF)	C113	1-101-869	27 pF ceramic
CT331	1-141-078	capacitor, trimmer (16 pF)	C114	1-101-976	10 pF ceramic
CT332	1-141-078	capacitor, trimmer (16 pF)	C115	1-101-072	0.01 μ F ceramic
CT333	1-141-080	capacitor, trimmer (10pF)	C116	1-101-072	0.01 μ F ceramic
CT334	1-141-078	capacitor, trimmer (16 pF)	C117	1-101-072	0.01 μ F ceramic
CT335	1-141-079	capacitor, trimmer (10pF)	C118	1-105-829-12	0.0047 μ F mylar
CT336	1-141-080	capacitor, trimmer (10pF)	C119	1-101-918	0.001 μ F ceramic
CT337	1-141-079	capacitor, trimmer (10pF)	C120	1-101-072	0.01 μ F ceramic
CT338	1-141-079	capacitor, trimmer (10pF)	C121	1-101-958	8 pF ceramic
CT339	1-141-080	capacitor, trimmer (10pF)	C122	1-101-958	8 pF ceramic
CT401		— discarded —	C201	1-105-673-12	0.01 μ F mylar
CT402	1-141-135	capacitor, trimmer (30pF)	C202	1-105-673-12	0.01 μ F mylar
CT403	1-141-135	capacitor, trimmer (30pF)	C203		— discarded —
CT404	1-141-135	capacitor, trimmer (30pF)	C204	1-105-673-12	0.01 μ F mylar
CT405	1-141-135	capacitor, trimmer (30pF)	C205	1-105-673-12	0.01 μ F mylar
CT406	1-141-135	capacitor, trimmer (30pF)	C206	1-105-673-12	0.01 μ F mylar
CT407	1-141-135	capacitor, trimmer (30pF)	C207	1-105-673-12	0.01 μ F mylar
CT408	1-141-135	capacitor, trimmer (30pF)	C208	1-105-673-12	0.01 μ F mylar
CT409	1-141-135	capacitor, trimmer (30pF)	C209	1-105-673-12	0.01 μ F mylar
C01	1-101-867	24 pF ceramic	C210	1-105-673-12	0.01 μ F mylar
C02	1-101-867	24 pF ceramic	C211	1-102-939	2 pF ceramic
C03	1-101-867	24 pF ceramic	C212	1-105-673-12	0.01 μ F mylar

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C213	1-105-673-12	0.01 μ F	mylar	C322	1-107-063	12pF	silvered mica
C214	1-105-673-12	0.01 μ F	mylar	C323		— discarded —	
C215	1-102-939	2pF	ceramic	C324	1-107-065	15pF	silvered mica
C216	1-105-673-12	0.01 μ F	mylar	C325	1-107-074	36pF	silvered mica
C217	1-105-673-12	0.01 μ F	mylar	C326	1-107-062	11pF	silvered mica
C218	1-107-085	100pF	silvered mica	C327	1-107-061	10pF	silvered mica
C219		— discarded —		C328	1-107-061	10pF	silvered mica
C220	1-121-469	10 μ F	10V electrolytic	C329	1-107-106	9pF	silvered mica
C221	1-107-092	200pF	silvered mica	C330	1-107-061	10pF	silvered mica
C222	1-107-092	200pF	silvered mica	C331	1-107-105	8pF	silvered mica
C223	1-121-469	10 μ F	10V electrolytic	C332	1-107-104	7pF	silvered mica
C224	1-121-402	33 μ F	10V electrolytic	C333	1-107-105	8pF	silvered mica
C225	1-102-950	13pF	ceramic	C334	1-107-104	7pF	silvered mica
C226	1-105-673-12	0.01 μ F	mylar	C335	1-101-924	0.02 μ F	ceramic
C227	1-102-962	30pF	ceramic	C336	1-101-923	0.01 μ F	ceramic
C228	1-105-673-12	0.01 μ F	mylar	C337	1-101-924	0.02 μ F	ceramic
C229		— discarded —		C338	1-101-924	0.02 μ F	ceramic
C230	1-121-469	10 μ F	10V electrolytic	C339	1-101-924	0.02 μ F	ceramic
C231	1-105-677-12	0.022 μ F	mylar	C340	1-107-074	36pF	silvered mica
C232		— discarded —		C341	1-103-619	560pF	styrol
C233		— discarded —		C342	1-107-093	220pF	silvered mica
C234	1-105-687-12	0.15 μ F	mylar	C343	1-107-085	100pF	silvered mica
C235	1-105-685-12	0.1 μ F	mylar	C344	1-107-082	75pF	silvered mica
C236	1-105-675-12	0.015 μ F	mylar	C345	1-107-081	68pF	silvered mica
C237	1-105-673-12	0.01 μ F	mylar	C346	1-107-076	43pF	silvered mica
C238	1-121-391	1 μ F	50V electrolytic	C347	1-107-081	68pF	silvered mica
C239	1-121-391	1 μ F	50V electrolytic	C348	1-107-082	75pF	silvered mica
C240	1-105-661-12	0.001 μ F	mylar	C349	1-107-074	36pF	silvered mica
C241	1-121-391	1 μ F	50V electrolytic	C350	1-107-069	22pF	silvered mica
C242	1-121-469	10 μ F	10V electrolytic	C351	1-107-069	22pF	silvered mica
C244	1-105-677-12	0.022 μ F	mylar	C352	1-107-073	33pF	silvered mica
C301	1-103-619	560pF	styrol	C353	1-107-081	68pF	silvered mica
C302	1-107-093	220pF	silvered mica	C354	1-107-069	22pF	silvered mica
C303	1-107-085	100pF	silvered mica	C355	1-107-070	24pF	silvered mica
C304	1-107-082	75pF	silvered mica	C356	1-107-064	13pF	silvered mica
C305	1-107-081	68pF	silvered mica	C357		— discarded —	
C306	1-107-076	43pF	silvered mica	C358	1-107-069	22pF	silvered mica
C307	1-107-081	68pF	silvered mica	C359	1-107-079	56pF	silvered mica
C308	1-107-082	75pF	silvered mica	C360	1-107-065	15pF	silvered mica
C309	1-107-074	36pF	silvered mica	C361	1-107-071	27pF	silvered mica
C310	1-107-069	22pF	silvered mica	C362	1-107-063	12pF	silvered mica
C311	1-107-069	22pF	silvered mica	C363		— discarded —	
C312	1-107-073	33pF	silvered mica	C364	1-107-065	15pF	silvered mica
C313	1-107-081	68pF	silvered mica	C365	1-107-074	36pF	silvered mica
C314	1-107-069	22pF	silvered mica	C366	1-107-062	11pF	silvered mica
C315	1-107-070	24pF	silvered mica	C367	1-107-061	10pF	silvered mica
C316	1-107-064	13pF	silvered mica	C368	1-107-061	10pF	silvered mica
C317		— discarded —		C369	1-107-106	9pF	silvered mica
C318	1-107-069	22pF	silvered mica	C370	1-107-061	10pF	silvered mica
C319	1-107-079	56pF	silvered mica	C371	1-107-106	9pF	silvered mica
C320	1-107-065	15pF	silvered mica	C372	1-107-104	7pF	silvered mica
C321	1-107-071	27pF	silvered mica	C373	1-107-105	8pF	silvered mica
				C374	1-107-104	7pF	silvered mica

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C375	1-101-923	0.01 μ F	ceramic	C407	1-105-843-12	0.068 μ F	mylar
C376	1-107-090	160pF	silvered mica	C408	1-105-837-12	0.022 μ F	mylar
C377	1-107-086	110pF	silvered mica	C409	1-105-841-12	0.047 μ F	mylar
C378	1-107-083	82pF	silvered mica	C410	1-103-606	160pF	styrol
C379	1-107-083	82pF	silvered mica	C411	1-105-837-12	0.022 μ F	mylar
C380	1-107-083	82pF	silvered mica	C412	1-103-627	1,200pF	styrol
C381	1-107-082	75pF	silvered mica	C413	1-103-615	390pF	styrol
C382	1-107-082	75pF	silvered mica	C414	1-107-089	150pF	silvered mica
C383	1-107-080	62pF	silvered mica	C415	1-101-882	51pF	ceramic
C384	1-107-080	62pF	silvered mica	C416	1-105-841-12	0.047 μ F	mylar
C385	1-107-080	62pF	silvered mica	C417	1-105-833-12	0.01 μ F	mylar
C386	1-107-079	56pF	silvered mica	C418	1-105-837-12	0.022 μ F	mylar
C387	1-107-079	56pF	silvered mica	C419	1-121-413	100 μ F	6.3 V electrolytic
C388	1-107-079	56pF	silvered mica	C501	1-102-944	7pF	ceramic
C389	1-107-078	51pF	silvered mica	C502	1-105-673-12	0.01 μ F	mylar
C390	1-107-078	51pF	silvered mica	C503	1-121-402	33 μ F	10V electrolytic
C391	1-107-078	51pF	silvered mica	C504	1-105-673-12	0.01 μ F	mylar
C392	1-107-077	47pF	silvered mica	C505	1-121-469	10 μ F	10V electrolytic
C393	1-107-073	33pF	silvered mica	C506	1-105-673-12	0.01 μ F	mylar
C394	1-105-673-12	0.01 μ F	mylar	C507	1-105-673-12	0.01 μ F	mylar
C395	1-103-601	100pF	styrol	C508	1-105-673-12	0.01 μ F	mylar
C396	1-102-871	43pF	ceramic	C509	1-121-409	47 μ F	16 V electrolytic
C397	1-103-612	300pF	styrol	C510	1-102-943	6pF	ceramic
C398	1-107-101	4pF	silvered mica	C511		— discarded —	
C399	1-105-673-12	0.01 μ F	mylar	C512	1-102-951	15pF	ceramic
C1301	1-101-918	0.001 μ F	ceramic	C513	1-105-673-12	0.01 μ F	mylar
C1302	1-105-673-12	0.01 μ F	mylar	C514	1-121-402	33 μ F	10V electrolytic
C1303	1-105-673-12	0.01 μ F	mylar	C515	1-105-673-12	0.01 μ F	mylar
C1304	1-107-096	300pF	silvered mica	C516	1-107-092	200pF	silvered mica
C1305	1-107-078	51pF	silvered mica	C517	1-107-092	200pF	silvered mica
C1306	1-105-673-12	0.01 μ F	mylar	C518	1-105-673-12	0.01 μ F	mylar
C1307	1-107-061	10pF	silvered mica	C519	1-105-673-12	0.01 μ F	mylar
C1308	1-105-673-12	0.01 μ F	mylar	C520	1-121-469	10 μ F	10V electrolytic
C1309	1-105-673-12	0.01 μ F	mylar	C521	1-121-391	1 μ F	50V electrolytic
C1310	1-101-923	0.01 μ F	ceramic	C522		— discarded —	
C1311	1-101-923	0.01 μ F	ceramic	C523		— discarded —	
C1312	1-107-069	22pF	silvered mica	C524	1-107-089	150pF	silvered mica
C1313	1-107-098	1pF	silvered mica	C525	1-107-073	33pF	silvered mica
C1314	1-107-070	24pF	silvered mica	C526	1-107-085	100pF	silvered mica
C1315	1-107-085	100pF	silvered mica	C527	1-107-074	36pF	silvered mica
C1316	1-105-673-12	0.01 μ F	mylar	C528	1-107-082	75pF	silvered mica
C1317	1-105-673-12	0.01 μ F	mylar	C529	1-105-673-12	0.01 μ F	mylar
C1318	1-103-607	180pF	styrol	C530	1-121-402	33 μ F	10V electrolytic
C1319	1-107-100	3pF	silvered mica	C531	1-105-673-12	0.01 μ F	mylar
C1320	1-103-607	180pF	styrol	C532	1-105-673-12	0.01 μ F	mylar
C401	1-107-069	22pF	silvered mica	C533	1-105-673-12	0.01 μ F	mylar
C402	1-103-636	3,000pF	styrol	C534	1-107-096	300pF	silvered mica
C403	1-103-620	620pF	styrol	C535	1-105-673-12	0.01 μ F	mylar
C404	1-105-837-12	0.022 μ F	mylar	C601	1-121-469	10 μ F	10V electrolytic
C405	1-105-839-12	0.033 μ F	mylar	C602	1-107-235	510pF	silvered mica
C406	1-105-841-12	0.047 μ F	mylar	C603	1-105-661-12	0.001 μ F	mylar

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C604	1-121-415	100 μ F	16 V	electrolytic	VR603	1-222-195	tone control, BASS 50 k Ω -A		
C605	1-121-469	10 μ F	10 V	electrolytic	VR801	1-221-634-12	adjustable resistor, 1 k Ω -B		
C606	1-105-665-12	0.0022 μ F		mylar	VR802	1-222-551	BFO control, 5 k Ω -D		
C607	1-105-677-12	0.022 μ F		mylar	VR901	1-222-985	adjustable resistor, MUTING level		
C608	1-105-681-12	0.047 μ F		mylar	R01	1-208-027	560 Ω	1/16 W	ceramic
C609	1-127-019	0.1 μ F	10 V	electrolytic (alox)	R02	1-208-027	560 Ω	1/16 W	ceramic
C610	1-121-415	100 μ F	16 V	electrolytic	R03	1-244-497	10 k Ω	1/8 W	carbon
C611	1-121-469	10 μ F	10 V	electrolytic	R04	1-244-501	15 k Ω	1/8 W	carbon
C612	1-105-673-12	0.01 μ F		mylar	R05	1-208-045	3.3 k Ω	1/16 W	ceramic
C613	1-121-415	100 μ F	16 V	electrolytic	R06	1-208-145	100 k Ω	1/16 W	ceramic
C614	1-121-245	1,000 μ F	16 V	electrolytic	R07	1-208-145	100 k Ω	1/16 W	ceramic
C615	1-105-671-12	0.0068 μ F		mylar	R08	1-208-088	200 k Ω	1/16 W	ceramic
C616	1-105-671-12	0.0068 μ F		mylar	R09	1-208-027	560 Ω	1/16 W	ceramic
C617	1-105-673-12	0.01 μ F		mylar	R10	1-208-033	1 k Ω	1/16 W	ceramic
C618	1-121-245	1,000 μ F	16 V	electrolytic	R101	1-208-027	560 Ω	1/16 W	ceramic
C619	1-121-469	10 μ F	10 V	electrolytic	R102	1-208-027	560 Ω	1/16 W	ceramic
C620	1-105-673-12	0.01 μ F		mylar	R103	1-244-697	10 k Ω		
C621	1-105-681-12	0.047 μ F		mylar	R104	1-244-697	10 k Ω		
C622	1-121-469	10 μ F	10 V	electrolytic	R105	1-208-045	3.3 k Ω	1/16 W	ceramic
C623	1-121-395	4.7 μ F	25 V	electrolytic	R106	1-208-145	100 k Ω	1/16 W	ceramic
C624	1-121-469	10 μ F	10 V	electrolytic	R107	1-208-145	100 k Ω	1/16 W	ceramic
C625	1-127-020	0.22 μ F	10 V	electrolytic (alox)	R108	1-208-088	200 k Ω	1/16 W	ceramic
C626	1-105-671-12	0.0068 μ F		mylar	R109	1-208-027	560 Ω	1/16 W	ceramic
C701	1-127-020	0.22 μ F	10 V	electrolytic (alox)	R110	1-208-033	1 k Ω	1/16 W	ceramic
C801	1-105-679-12	0.033 μ F		mylar	R201	1-244-660	300 Ω		
C802	1-105-675-12	0.015 μ F		mylar	* R202	1-244-706	24 k Ω		
C803		— discarded —				1-244-707	27 k Ω		
C804	1-101-914	100 pF		ceramic		1-244-708	30 k Ω		
C805	1-107-096	300 pF		silvered mica		1-244-709	33 k Ω		
C806	1-105-677-12	0.022 μ F		mylar	R203	1-244-704	20 k Ω		
C807	1-105-679-12	0.033 μ F		mylar	R204	1-244-643	56 Ω		
C808	1-105-677-12	0.022 μ F		mylar	R205	1-244-671	820 Ω		
C809	1-105-673-12	0.01 μ F		mylar	R206	1-244-670	750 Ω		
C901	1-105-841-12	0.047 μ F		mylar	R207	1-244-708	30 k Ω		
C001	1-115-110	0.0047 μ F	600 V	paper	R208	1-244-697	10 k Ω		
C002	1-115-110	0.0047 μ F	600 V	paper	R209	1-244-650	110 Ω		
C003	1-121-389	2,200 μ F	25 V	electrolytic	R210	1-244-653	150 Ω		
C004	1-121-389	2,200 μ F	25 V	electrolytic	R211	1-244-709	33 k Ω		
CP301~305	1-101-799	2,000 pF		ceramic	R212	1-244-643	56 Ω		
HT301~304	1-535-036			hermetic terminal	R213	1-244-697	10 k Ω		
					R214	1-244-665	470 Ω		
					R215	1-244-684	3 k Ω		
					R216	1-244-660	300 Ω		
					R217	1-244-660	300 Ω		
					R218	1-244-705	22 k Ω		
					R219	1-244-643	56 Ω		
					R220	1-244-697	10 k Ω		
					R221	1-244-657	220 Ω		
					R222	1-244-707	27 k Ω		
					R223	1-244-657	220 Ω		
					R224	1-244-649	100 Ω		

RESISTORS

All resistors are 1/4 W $\pm$ 5% carbon type resistors unless otherwise noted.

VR201	1-221-635	adjustable resistor 5 k Ω
VR501	1-222-194-12	MGC control, 20 k Ω -B
VR601	1-222-218	VOLUME control, 50 k Ω -D
VR602	1-222-195	tone control, TREBLE 50 k Ω -A

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R225	1-244-706	24 kΩ	R308	1-244-685	3.3 kΩ
R226	1-244-706	24 kΩ	R309	1-244-684	3 kΩ
R227	1-244-665	470 Ω	R310	1-244-693	6.8 kΩ
R228	1-244-656	200 Ω	R311	1-244-683	2.7 kΩ
R229	1-244-662	360 Ω	R312	1-244-649	100 Ω
R230	1-244-673	1 kΩ	R313	1-244-693	6.8 kΩ
R231	1-244-673	1 kΩ	R314	1-244-680	2 kΩ
R232	1-244-689	4.7 kΩ	R315	1-244-684	3 kΩ
R233	1-244-689	4.7 kΩ	R316	1-244-653	150 Ω
R234	1-244-691	5.6 kΩ	R317	1-244-690	5.1 kΩ
R235	1-244-691	5.6 kΩ	R318	1-244-705	22 kΩ
R236	1-244-684	2.4 kΩ	R319	1-244-656	200 Ω
R237	1-244-727	180 kΩ	R320	1-244-680	2 kΩ
R238	1-244-690	5.1 kΩ	R321	1-244-715	56 kΩ
R239	1-244-681	2.2 kΩ	R322	1-244-715	56 kΩ
R240	1-244-635	27 Ω	R323	1-244-710	36 kΩ
R241	1-244-687	3.9 kΩ	R324	1-244-691	5.6 kΩ
R242	1-244-719	82 kΩ	R325	1-244-673	1 kΩ
R243	1-244-730	240 kΩ	R326	1-244-656	200 Ω
R244	1-244-730	240 kΩ	R327	1-244-709	33 kΩ
R245	1-244-697	10 kΩ	R328	1-244-709	33 kΩ
R246	1-244-732	300 kΩ			
R247	1-244-714	51 kΩ			
R248	1-244-706	24 kΩ	* R401	{ 1-242-717	68 kΩ
R249	1-244-714	51 kΩ		{ 1-242-718	75 kΩ
R250	1-244-691	5.6 kΩ		{ 1-242-719	82 kΩ
R251	1-244-667	560 Ω	R402	1-242-701	15 kΩ
R252	1-244-695	8.2 kΩ	R403	1-242-673	1 kΩ
R253	1-244-713	47 kΩ	R404	1-242-665	470 Ω
R254	1-244-677	1.5 kΩ	R405	1-242-684	3 kΩ
R255	1-244-677	1.5 kΩ	R406	1-242-673	1 kΩ
R256	1-244-656	200 Ω	R407	1-242-681	2.2 kΩ
R257	1-244-690	5.1 kΩ	R408	1-242-694	7.5 kΩ
R258	1-244-730	240 kΩ	R409	1-242-697	10 kΩ
R259	1-244-730	240 kΩ	R410	1-242-681	2.2 kΩ
R260	1-244-721	100 kΩ	R411	1-242-697	10 kΩ
R261	1-244-721	100 kΩ	R412	1-242-673	1 kΩ
R262	1-244-721	100 kΩ	R413	1-242-673	1 kΩ
R263	1-244-721	100 kΩ	R414	1-242-684	3 kΩ
R264	1-244-721	100 kΩ	R415	1-242-677	1.5 kΩ
R265	1-244-721	100 kΩ	R416	1-242-665	470 Ω
R266	1-244-641	47 Ω	R417	1-242-714	51 kΩ
R267	1-244-665	470 Ω	R418	1-242-677	1.5 kΩ
R268	1-244-656	200 Ω	R419	1-242-708	30 kΩ
R269	1-244-643	56 Ω	R420	1-242-665	470 Ω
			R421	1-202-647	1.2 MΩ ½ W composition
R301	1-202-647	1.2 MΩ ½ W composition		{ 1-244-684	3 kΩ
R302	1-244-703	18 kΩ		{ 1-244-685	3.3 kΩ
R303	1-244-713	47 kΩ	* R422	{ 1-244-686	3.6 kΩ
R304	1-244-690	5.1 kΩ		{ 1-244-687	3.9 kΩ
R305	1-244-703	18 kΩ		{ 1-244-688	4.3 kΩ
R306	1-244-724	130 kΩ		{ 1-244-689	4.7 kΩ
R307		— discarded —		{ 1-244-690	5.1 kΩ
			R423	1-244-657	220 Ω

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R501	1-244-697	10 k Ω	R606	1-244-653	150 Ω
R502	1-244-684	3 k Ω	R607	1-244-676	1.3 k Ω
* R503	1-244-714	51 k Ω	R608	1-244-684	3 k Ω
	1-244-715	56 k Ω	R609	1-244-673	1 k Ω
	1-244-716	62 k Ω	R610	1-244-690	5.1 k Ω
	1-244-717	68 k Ω	R611	1-244-697	10 k Ω
R504	1-244-701	15 k Ω	R612	1-244-691	5.6 k Ω
R505	1-244-666	510 Ω	R613	1-244-675	1.2 k Ω
R506		— discarded —	R614	1-244-680	2 k Ω
* R507	1-244-714	51 k Ω	R615	1-244-708	30 k Ω
	1-244-715	56 k Ω	R616	1-244-697	10 k Ω
	1-244-716	62 k Ω	R617	1-244-657	220 Ω
	1-244-717	68 k Ω	R618	1-244-633	22 Ω
R508	1-244-685	3.3 k Ω	R619	1-244-691	5.6 k Ω
R509	1-244-705	22 k Ω	R620	1-244-664	430 Ω
R510	1-244-684	3 k Ω	R621	1-244-664	430 Ω
R511	1-244-666	510 Ω	R622	1-244-677	1.5 k Ω
R512	1-244-718	75 k Ω	R623	1-244-657	220 Ω
R513	1-244-666	510 Ω	R624	1-244-657	220 Ω
R514	1-244-705	22 k Ω	R625	1-244-601	1 Ω
R515	1-244-657	220 Ω	R626	1-244-601	1 Ω
R516	1-244-701	15 k Ω	R627	1-244-601	1 Ω
R517	1-244-680	2 k Ω	R628	1-244-601	1 Ω
R518	1-244-680	2 k Ω	R629	1-244-723	120 k Ω
R519	1-244-692	6.2 k Ω	R630	1-244-695	8.2 k Ω
R520	1-244-689	4.7 k Ω	R631	1-244-721	100 k Ω
R521	1-244-708	30 k Ω	R632	1-244-690	5.1 k Ω
R522	1-244-680	2 k Ω	R633	1-244-675	1.2 k Ω
R523	1-244-693	6.8 k Ω	R634	1-244-673	1 k Ω
R524	1-244-697	10 k Ω	R635	1-244-690	5.1 k Ω
R525	1-244-697	10 k Ω	R636	1-244-697	10 k Ω
R526	1-244-697	10 k Ω	R637	1-244-719	82 k Ω
R527	1-244-697	10 k Ω	R638	1-244-853	150 Ω $\frac{1}{2}$ W carbon
R528	1-244-661	330 Ω	R639	1-244-675	1.2 k Ω
R529	1-244-673	1 k Ω	R640	1-244-681	2.2 k Ω
R530	1-244-680	2 k Ω			
R531	1-244-693	6.8 k Ω	R701	1-244-673	1 k Ω
R532	1-244-666	510 Ω	R702	1-244-702	10 k Ω
R533		— discarded —		1-244-652	130 Ω
R534	1-244-705	22 k Ω		1-244-653	150 Ω
R535	1-244-686	3.6 k Ω	* R703	1-244-654	160 Ω
R536		— discarded —		1-244-655	180 Ω
R537	1-244-675	1.2 k Ω		1-244-656	200 Ω
R538	1-244-690	5.1 k Ω		1-244-657	220 Ω
R539		— discarded —	R704	1-244-673	1 k Ω
R540	1-244-712	43 k Ω	R705	1-244-684	3 k Ω
R541	1-244-697	10 k Ω	R706	1-244-662	360 Ω
			R707	1-244-653	150 Ω
R601	1-244-690	5.1 k Ω	R708	1-244-669	680 Ω
R602	1-244-713	47 k Ω	R709	1-244-721	100 k Ω
R603	1-244-665	470 Ω	R710	1-244-650	110 Ω
R604	1-244-707	27 k Ω	R711	1-244-650	110 Ω
R605	1-244-693	6.8 k Ω	R712	1-244-650	110 Ω

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R713	1-244-650	110Ω		S503		switch, MGC; built in MGC control (VR501)
R714	1-244-650	110Ω		S701	1-514-503	lever seesaw switch, POWER
R801	1-244-668	620Ω		S702		switch, ext power/battery select; built in ext power connector
R802	1-244-676	1.3 kΩ		S703	1-513-285	slide switch, LIGHT
R803	1-244-669	680Ω		S710	1-513-285	slide switch, BATTERY CHECK
R804	1-244-654	160Ω		S704~709		switch, lamp; built in band selector
R805	1-244-663	390Ω		S801	1-514-913	slide switch, BFO ON/OFF
R806	1-244-710	36 kΩ		S901	1-514-673	slide switch, SENSITIVITY
R807	1-244-704	20 kΩ		S902	1-514-304	slide switch, ROD ANT/EXT ANT
R808	1-244-697	10 kΩ			1-526-165-21	voltage selector
R809	1-244-673	1 kΩ			1-532-049-11	fuse (Canada and General Export model)
R901	1-244-677	1.5 kΩ			1-532-228-11	fuse (USA model)
R902	1-202-647	1.2 MΩ	1/2 W composition		1-533-048	holder, fuse
R903	1-244-683	2.7 kΩ		LA701~709	1-518-114-11	lamp
R904	1-244-721	100 kΩ		TM001	1-520-082-14S	meter, tuning and battery check
R001	1-211-001	5.1Ω	1 W carbon		1-536-111	terminal strip
R002	1-202-545	68Ω	1/2 W composition		1-536-183	terminal strip
R003	1-202-549	100Ω	1/2 W composition	FM TEL ANT	1-501-103-12	telescopic antenna, fm
R004	1-202-653	2.2 MΩ	1/2 W composition	SW TEL ANT	1-501-104-12S	telescopic antenna, sw
MISCELLANEOUS				SP1	1-502-210	speaker
1-538-793-12	printed circuit board, fm1	} sw front end		SP2	1-502-210	speaker
1-538-793-12	printed circuit board, fm2			J601	1-507-169-13	jack, AUX IN
1-538-825-11	printed circuit board, G			J602	1-507-169-13	jack, REC OUT
1-538-826-11	printed circuit board, F			J603	1-507-190-12	jack, HEADPHONE
1-538-827-11	printed circuit board, disk E			J604	1-507-169-13	jack, EARPHONE
1-538-828-11	printed circuit board, disk D			J605	1-507-169-13	jack, EXT SP
1-538-829-11	printed circuit board, disk C			J606	1-507-169-13	jack, MPX OUT
1-538-830-11	printed circuit board, disk B			J607	1-509-029-02	jack, TAPE
1-538-831-11	printed circuit board, disk A				1-507-901-12	nut, jack
1-581-176-11	printed circuit board, rf				1-508-377-11	connector, ac/ext dc power supply
1-581-177-12	printed circuit board, osc				8-981-373-10	fm front end block, FM1 (FMC-094J2)
1-581-165-11	printed circuit board, cp				8-981-367-10	fm front end block, FM2 (FMC-094W1)
1-581-168-11	printed circuit board, main				8-981-411-51	sw front end block, SW2~SW19 (SWC-011D2)
1-581-166-11	printed circuit board, switch				8-981-411-16	mounted circuit board, main
1-581-167-11	printed circuit board, power supply				8-981-411-35	mounted circuit board, cp
S101	1-514-673	slide switch, FM1/FM2 select			8-981-411-17	mounted circuit board, switch
S201	1-514-673	slide switch, FM/AM select			8-981-411-45	mounted circuit board, power (USA and Canada model)
S202	1-513-272	slide switch, AFC			8-981-424-45	mounted circuit board, power (General Export model)
S203	1-513-272	slide switch, MUTING				
S401	1-513-304	slide switch, band selector SW1				
S402	1-513-304	slide switch, band selector MW				
S403	1-513-304	slide switch, band selector LW				
S404	1-513-302	slide switch, band selector				
S501	1-513-274	SW2~SW19				
S502	1-513-274	slide switch, SELECTIVITY				
		slide switch, ANL				

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